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SEPTEMBER 1951 VOLUME XXXI NUMBER 6

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MILITARY REVIEW

VOLUME XXXI SEPTEMBER 1951 NUMBER 6

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North Atlantic Treaty Organization

Colonel Maddrey A. Solomon, *Artillery*
Instructor, Army War College

WHEN Supreme Headquarters, Allied Powers Europe (SHAPE), became operational in Paris on 2 April 1951, the North Atlantic Treaty Organization (NATO) became more important than any similar arrangement in history. Here, for the first time, international forces were unified under a single military commander for defense against aggression. Two years of intense effort to organize against communistic imperialism finally had produced tangible results.

Western Union

Mutual conferences to consider plans for a defense against aggressor nations began in February 1948, when the Communists overthrew the Czechoslovak Government. At this time, the United Kingdom, France, Belgium, the Netherlands, and Luxembourg committed themselves to the Brussels Treaty. Under this arrangement, called Western Union, all the signatories agreed to give "all military and other aid and assistance in their power" should one of them be attacked in Europe. A month later, President Truman requested the people of the United States to support the Brussels Treaty. He also expressed the hope that the determination of free people to defend themselves would be "matched by an equal determination on our part to help them do so."

North Atlantic Treaty

In June 1948, Senator Vandenberg led a bipartisan effort which culminated in talks between the United States and the Western Union countries relative to the mutual and collective defense of the North Atlantic area. Out of these discussions came the North Atlantic Treaty, which is commonly known as the Atlantic Pact.

The North Atlantic Treaty is a collective, self-defensive arrangement entered into by the United States, Canada, the United Kingdom, France, Norway, Denmark, Belgium, the Netherlands, Luxembourg, Italy, Portugal, and Iceland. The treaty went into effect on 24 August 1949, when all 12 of the participating nations had deposited their ratification documents in Washington.

In the preamble to the North Atlantic Treaty, the signatories reaffirmed their faith in the purposes and principles of the United Nations. They also pledged themselves to combine their efforts for collective defense and the preservation of peace and security. A summary of the 14 articles of the treaty follows:

Organized within the framework of the UN to maintain peace and security, NATO is a functioning defensive unit. Its formation is a monumental step forward as free men strive to remain free—with honor

Article 1.—The signatories undertake to settle any international dispute in which they may be involved by peaceful means, and to refrain from the threat or the use of force in any manner inconsistent with the purposes of the United Nations.

Article 2.—The signatories will contribute toward the further development of peaceful and friendly international relations by strengthening their free institutions, and promoting conditions of stability and well-being. They will seek to eliminate conflict in their international economic policies, and encourage economic collaboration between any or all members of the Atlantic Pact.

Article 3.—To achieve the objectives of this treaty more effectively, the signatories, separately and jointly, will maintain and develop their individual and collective capacity to resist armed attack by means of continuous self-help and mutual aid.

Article 4.—Signatories agree to consult together whenever, in the opinion of any one of them, the territorial integrity, political independence, or security of any member is threatened.

Article 5.—An armed attack against one or more of the signatories in Europe or North America shall be considered an attack against all. In the exercise of the right of individual or collective self-defense, recognized by Article 51 of the United Nations Charter, such action as is deemed necessary will be taken, including the use of armed force, to restore and maintain the security of the North Atlantic area. The attack and countermeasures shall be reported to the United Nations Security Council immediately, and such action shall be terminated when the Council has taken measures to restore international peace.

Article 6.—The provisions of Article 5 also shall apply to the territories of any of the signatories in Europe and North America, the Algerian Departments of France, the occupation forces of any of the signatories in Europe, and to their islands, warships, and aircraft in the North Atlantic area.

Article 7.—The treaty does not affect, and shall not be interpreted as affecting, the rights and obligations of United Nations member nations under the Charter, or the primary responsibility of the United Nations Security Council for the maintenance of international peace and security.

Article 8.—The signatories declare that none of their engagements with any of the cosignatories, or any third state, is in conflict with the provisions of the treaty, and they undertake not to enter into any such engagements.

Article 9.—Signatories agree to establish a council, on which all are represented, to consider the necessary steps toward implementing the treaty.

Article 10.—Under this article, other European nations, in a position to contribute to the collective security in the North Atlantic area, may be invited to join by the unanimous agreement of the signatories.

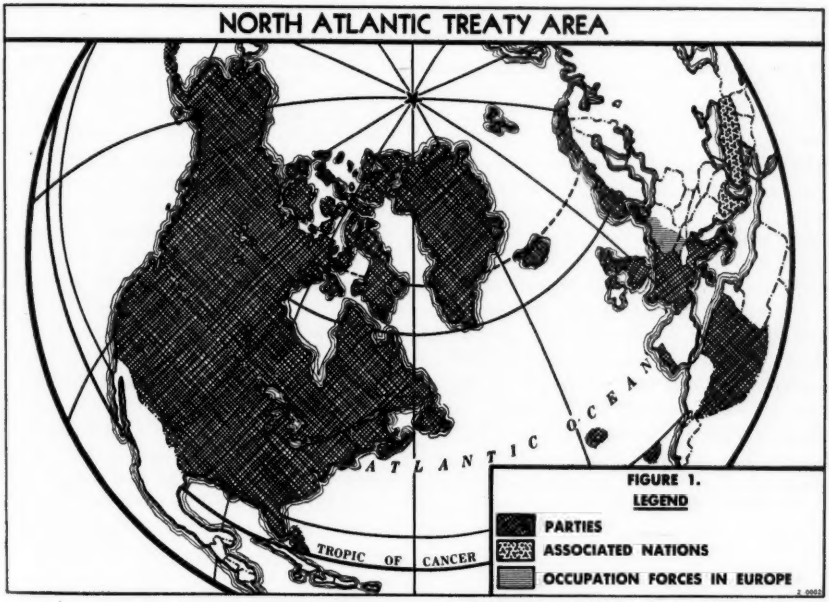
Articles 11-14.—These remaining articles provide for the admission of new parties to the treaty, its ratification by the signatories, method of revision, and denunciation by any member who desires to retire from the treaty.

Article 5 and the Constitution

The relationship of Article 5 of the treaty—the essence of the agreement—to the United States Constitution is of some significance. Under this article, an attack by an aggressor against any one member is considered to be an attack against all. In such an event, the United States is bound to take any necessary action required to maintain the security of the North Atlantic area. This action may be taken individually, or in concert with other members of the Atlantic Pact.

The United States Constitution, on the other hand, specifically empowers Congress

only to declare war. The question logically arises, therefore, does the use of United States Armed Forces under Article 5 automatically place the country at war? The answer is *no*. Action under Article 5 is taken only *in case of an attack*. Thus, the Nation, even as an individual, is empowered to defend itself immediately when assaulted. The declaration of a state of war remains for Congress to decide in accordance with constitutional procedures.



Organization

The principal body of the North Atlantic Treaty Organization is the Council. (See Figure 2.) Its membership, depending on the agenda to be discussed, is drawn from government ministers on the highest political level. It may be composed of foreign ministers, defense ministers, finance ministers, or heads of states, as appropriate. In accordance with the provisions of the treaty, the Council is charged with the responsibility of considering all high-level governmental matters concerning the implementation of the provisions of the treaty.

The Council meets once a year in ordinary session and at such other times as is considered necessary by the majority of the members. Normally, the ordinary session is held, for convenience, at about the same time and in the same general geographical area as the General Assembly of the United Nations. The chairmanship at these meetings rotates in alphabetical order among the member nations.

The Council of Deputies represents the Council on a permanent basis. Although the Deputies are located in London, they may be convened elsewhere at the direction of the Council Chairman.

Since the Council is not always in session, the Council of Deputies is responsible for the execution of approved policy as well as the formulation of recommendations to the member governments on new issues requiring decisions. The Deputies

have authority to register approval, for their respective governments, on current matters under consideration. They also give guidance to other permanent organizations of NATO, exchange views on matters of interest within the framework of the treaty, and co-ordinate public information activities.

The Defense Production Board, which has a permanent working team located in London, is composed of a representative at the subministerial level from each member nation. Its task is to consider military production and supply, from the over-all viewpoint, in the defense of the North Atlantic area. Its objective is to achieve the maximum production of military equipment in the most efficient manner, at the least cost, and in the shortest possible time, in order to meet the military matériel requirements of the member nations.

On the same level with the Defense Production Board is the Finance Economic Board. This Board is responsible for recommendations relative to the financial and economic aspects of the NATO nations in connection with the common defense effort. Ordinarily, advice and recommendations are forwarded to the Council of Deputies. In specified cases, the Board may send communications directly to the member governments.

Also, on this level, is the Planning Board for Ocean Shipping. This Board is responsible for plans and policies relative to the ocean shipping of the member nations.

The principal military body of NATO is the Military Committee. It is composed of one military representative, on the chief of staff level, from each member nation, with the exception of Iceland—who is represented by a civilian acting as an observer — since Iceland has no military organization. This Committee is charged with advising the Council on military matters, and makes recommendations to the Council (Defense Ministers) concerning military measures for the unified defense of the North Atlantic area. It also provides general policy guidance to the Standing Group.

The Military Committee, like the Council, meets annually or when called by its chairman. Normally, it will meet in ordinary session immediately after a meeting of the Council. Its deliberations usually consist of approving strategic concepts and plans, requirements, and other related military defense matters.

The Military Representatives Committee is the full-time representation of the Military Committee. Its membership consists of one military member, of general or flag rank, from each NATO nation, except Iceland. The members have authority to act in all military matters except those that require full Military Committee approval. They also study and prepare recommendations on important issues for Military Committee consideration.

The full-time working staff of the Military Committee is the Standing Group. Its members consist of representatives from the United States, the United Kingdom, and France, who are also members of the Military Representatives Committee. As the principal military planning agency of NATO, the Standing Group's main task is the development of military defense plans within the scope of the treaty. It also gives strategic military guidance and direction to the Supreme Commanders and other subordinate commanders and planning groups under NATO.

Serving the Standing Group, in its varied fields of endeavor, is an international Secretariat and Staff composed of officers and civilians of the Standing Group member nations. This group has the job of preparing all papers for the Standing Group's consideration in the same manner as any other military staff.

The Military Standardization Agency, as its name implies, is a body, permanently located in London, charged with recommending the standardization of military weapons and equipment. Its membership

consists of representatives from the United States, The United Kingdom, France, and Canada. Other NATO nations are represented, as appropriate, in its subordinate working groups.

Command Groups

There are organized, presently, three command or planning organizations under NATO (Figure 2). They are Supreme Allied Commander, Europe (SACEUR); Supreme Allied Commander, Atlantic (SACLANT); and the Canada—United States Regional Planning Group. These organizations report directly to the Standing Group for policy guidance and for the integration of their defensive efforts. Provisions have been made for the establishment of further commands, or planning groups, as may be required in the future.

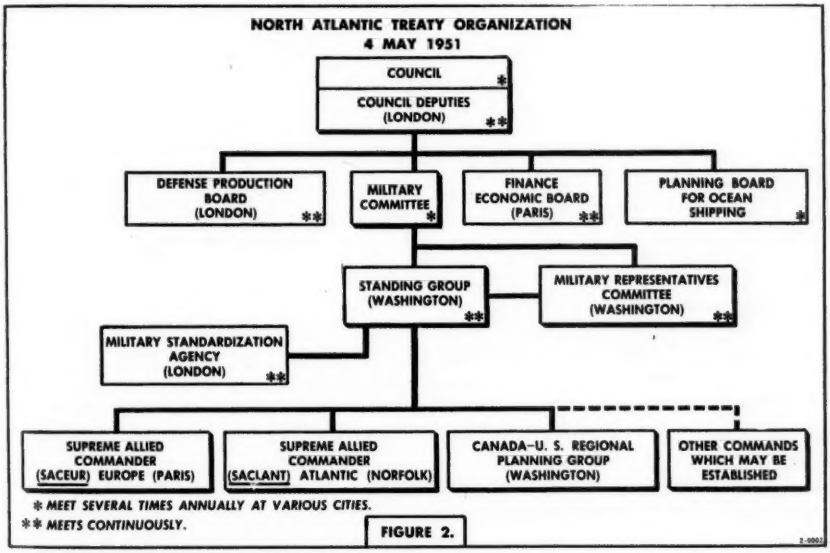

NORTH ATLANTIC TREATY ORGANIZATION
4 MAY 1951
COUNCIL *
COUNCIL DEPUTIES (LONDON) **
DEFENSE PRODUCTION BOARD (LONDON) **
MILITARY COMMITTEE *
FINANCE ECONOMIC BOARD (PARIS) **
PLANNING BOARD FOR OCEAN SHIPPING *
STANDING GROUP (WASHINGTON) **
MILITARY REPRESENTATIVES COMMITTEE (WASHINGTON) **
MILITARY STANDARDIZATION AGENCY (LONDON) **
SUPREME ALLIED COMMANDER (SACEUR) EUROPE (PARIS)
SUPREME ALLIED COMMANDER (SACLANT) ATLANTIC (NORFOLK)
CANADA–U. S. REGIONAL PLANNING GROUP (WASHINGTON)
OTHER COMMANDS WHICH MAY BE ESTABLISHED
* MEET SEVERAL TIMES ANNUALLY AT VARIOUS CITIES.
** MEETS CONTINUOUSLY.

FIGURE 2.

Regional Planning Groups

The purpose of the regional planning groups is to ensure speedy and effective defensive planning on a geographical basis. Originally, there were five such groups: Northern European, Southern European, Western European, North Atlantic Ocean, and the Canada—United States. The establishment of SACEUR and SACLANT eliminated all such groups except that involving Canada and the United States which still is continued in force. New planning groups can be formed should the necessity arise.

SACLANT

The SACLANT command organization has been formally announced only. Obviously, it is to be an Atlantic Ocean defensive arrangement. Its commander, boundaries of operation, mission, and contributory arrangements are not finalized at this time.

SACEUR

General Eisenhower's Supreme Headquarters, Allied Powers Europe, has been functioning on an operational basis since its formal opening on 2 April 1951. Its

organization has been publicly announced and is shown in Figure 3.

The SACEUR command structure requires little or no explanation. It is a time-tested military arrangement along sound command principles. There are three geographical sectors. General Eisenhower has delegated the command of the Northern and Southern Sectors to others, and has retained command of the Central Sector himself.

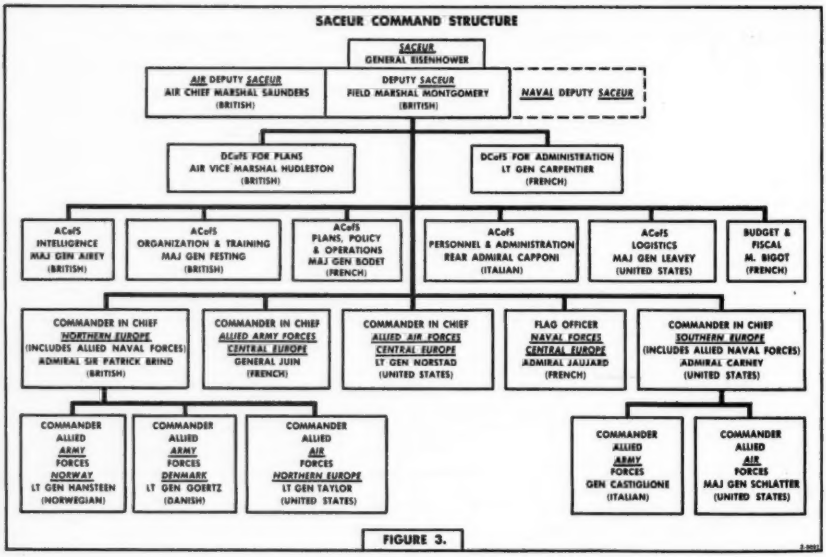


FIGURE 3.

Military Assistance

The military assistance program of the United States is not a part of the North Atlantic Treaty. Because of Article 3 of this treaty, however, it has often been felt that it is. In fact, military assistance had been given to Greece and Turkey prior to the treaty.

With the ratification of the treaty, however, military assistance assumed new importance. The United States, under Article 3, accelerated its military assistance program to NATO nations. This acceleration showed conclusively that the United States, acting under Article 3, desired to implement the treaty fully. Unquestionably, the program is improving the defenses and military capabilities of the NATO nations. It is increasing also their will to resist aggression.

Military assistance by the United States is necessary because the many war-torn NATO nations could not stand the strain both of economic recovery programs and rearmament, following World War II. It will be noted, however, that this aid is not accomplished completely and solely by the United States. Under Article 3, each country does what it can to meet its own requirements. The United States then contributes according to its ability. Likewise, other members may contribute to the United States.

Associate Countries

Greece and Turkey are associates of NATO only in that these two countries have the common desire of maintaining

their own peace and security. The United States has furnished military assistance to both nations in furtherance of this endeavor. Whether a regional grouping of the Near and Middle East, to be associated with NATO, is in the offing has not been revealed.

Conclusion

The North Atlantic Treaty Organization is a functioning, defensive unit. Its purpose is the co-ordination of self-defensive measures as provided for in Article 51 of the United Nations Charter. Its basis is a treaty within the framework of the United Nations, assuring practical measures for the maintenance of peace and security. It is growing daily in strength, as nations recover from the destruction of World War II. Confidence and determination are increasing also. It is a monumental step forward as free men, remembering the devastation of two global wars in the twentieth century, strive to remain free—with honor.

Sept 1951

Among the free nations, we are attaining an international political understanding. The North Atlantic Treaty, as a first step, is a stronger combination than the compulsory league of Soviet satellites. In our individual nations, we are stronger because each of us is free. In every satellite nation, where communism rules through the tyranny of a power-hungry minority, there exists a fundamental political weakness.

General of the Army Omar N. Bradley

Unit Rotation — The Long View

Lieutenant Colonel John H. Montgomery, Jr., *Infantry*
Instructor, Command and General Staff College

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

TODAY, the bulk of United States military strength is committed in Korea. Even after the shooting stops in that theater, large forces will be required to guard our Pacific frontiers for an indeterminate period. In addition, this country shortly will be called upon to furnish a sizable force-in-being in Europe and, at the same time, maintain a strategic reserve in the United States. In determining how to provide these forces, we are faced with two problems. First, how to raise and equip the required units, and, second, how to sustain them at the required strength and combat efficiency. The apparent planning difficulty in solving these problems revolves around the fact that they are so interrelated and interdependent that they must be solved together. The solution of one must contribute to the solution of the other, or our military forces will be in a continual state of turmoil until the threat to world peace is destroyed.

How, then, can we raise and maintain these large garrisons? There are several workable methods of raising the forces. We can call additional National Guard divisions into Federal service. We can call reserve units into active service. We can draw cadres from existing units and, on this framework, create new units. All of these methods are possible and any of them will furnish the basis for an expanded army. However, at this point we must consider how we are to sustain this force, once it is created.

Individual Replacement

At present, units, scheduled for overseas garrison duty, are trained to a prescribed standard of proficiency before being sent to the port of embarkation. From that point on, the unit, as such, is on foreign service for as long as that type unit is needed in that theater. Its personnel are rotated individually back to the Zone of Interior as their prescribed foreign service tour is completed, and individual replacements are furnished the unit to keep it up to strength. In wartime, this system of individual replacement is a most logical way of keeping a unit at full strength while providing a continuity of know-how, *esprit*, and efficiency. In peacetime, however, this system leaves much to be desired. Between World War I and II, the United States maintained garrisons in its insular possessions. These garrisons were composed of professional soldiers who had, in most cases, volunteered for service at that particular station. Yet the careful observer was struck by the inability of most foreign service units to reach the degree of efficiency of which they were potentially capable. The reason for this apparent failure was based on simple arithmetic. The normal foreign duty tour for individuals, prior to World

War II, was 30 months' service out of the United States. After a unit had been overseas for several years, the replacement flow became uniform. Approximately the same number of personnel arrived and departed each month. That meant that a foreign service unit had a guaranteed turnover of 40 percent a year, with an additional administrative loss from injuries, transfers, compassionate discharges, and court-martial convictions of about 2 percent each month. An overseas unit, therefore, lost approximately 64 percent of its personnel every year. That these units were efficient at all was due, primarily, to the fact that most of the replacements received were trained soldiers who had re-enlisted in order to serve at the station of their choice.

The situation faced today is even more difficult. If the United States is to maintain large forces overseas in inactive theaters, the individual period of foreign duty must be based upon the effective length of service of the inducted soldier. Assume that this period of active service is 27 months. We can determine immediately that the minimum time a soldier will spend in a tactical unit will be reduced by 2 months in a basic training unit, 2 months on furlough, and 2 months of travel time and processing. Therefore, our present replacement system permits a maximum of 21 months of foreign service. (It should be noted that approximately 4 months of this time will be spent in unit training, that is, up to preliminary regimental training exercises.) With this plan, we are assured of a mathematical rotation of 57 percent a year plus a 24 percent annual administrative loss. Taken together, we are almost certain of an 80 percent change-over in personnel in each unit, each year. (See chart on page 12.) It is true that this figure will be reduced somewhat by the presence of regular army personnel in each unit. However, obviously it is unfair to expect these regular soldiers to spend all of their careers overseas merely because they have volunteered for military service. Furthermore, it is necessary to rotate regular army personnel between foreign service and the Zone of Interior in order to equalize military educational opportunities, duty with civilian components, service on staffs, and command duty with troops.

Therefore, the turn-over in personnel on foreign service will be very close to 70 percent each year. Interpreting this data another way, nearly three men in four will be lost to each unit during its annual training cycle. New and untrained replacements will report to the unit each month. Key personnel will leave at the same rate. The development of a trained, co-ordinated team under such a system is impossible. Rather, it ensures mediocrity and lack of *esprit* in units, and discontent and frustration in individuals.

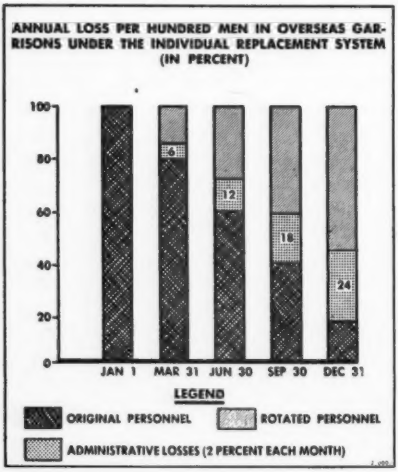
Unit Replacement

There is, however, a method of maintaining efficient integrated combat units overseas. This method is not new. It was employed by the Romans when guarding the frontiers of the Empire. England and France have used it on their frontiers. The United States used it when it was necessary to guard its frontiers against the Indians. Throughout history, armies charged with safeguarding a boundary

The strength of overseas garrisons is measured in terms of combat readiness, not in the number on unit rolls. The unit replacement system is a method of providing well-trained units with high morale and esprit

have maintained their frontier forces by rotating *units*. This system is as logical today as it was thousands of years ago.

Let us analyze this system of unit rotation to see if it will work for us at this time. The controlling factor again is the assumed length of service of the inducted soldier—27 months. Of the 27 months, we still lose 6 months for basic training, fur-



lough, travel time, and processing. The remaining 21 months all will be spent in one unit: 4 months in the United States and 17 months overseas.

To explain broadly the contemplated service cycle of a unit, we shall use an infantry division as an example. As soon as the division is activated, its cadre is assembled at the division home station. This cadre receives its refresher training before the arrival of the fillers. At the same time, commanders and staffs prepare training plans and programs. On Filler Day (F-day), fillers start arriving from the replacement training centers. Since the priority of overseas shipment already has been determined, those units which are scheduled to leave first are brought up to strength first. An intensive unit training schedule is now conducted for a period of 4 months. At the end of this phase, regiments, separate battalions, and separate companies have completed unit training; only combined training remains. The division is now ready to be shipped overseas. Units move out in the planned order of departure and, upon arrival in the overseas theater, each unit relieves a like unit of a returning division. Each division closes in its new station within a month of the time of arrival of the first unit. For the first 5 months after arriving overseas, the efficiency of each new division will be adequate only. During the next 6 months it should be well trained, and, during its last 6 months of service, its efficiency will be excellent.

In a theater with a strength of eight divisions, we will have, at all times, three excellent divisions, three satisfactory divisions, and two below-standard divisions. This situation is in marked contrast to eight below-standard divisions resulting from the employment of individual replacements, where we are unable to maintain any division at an efficiency level higher than satisfactory.

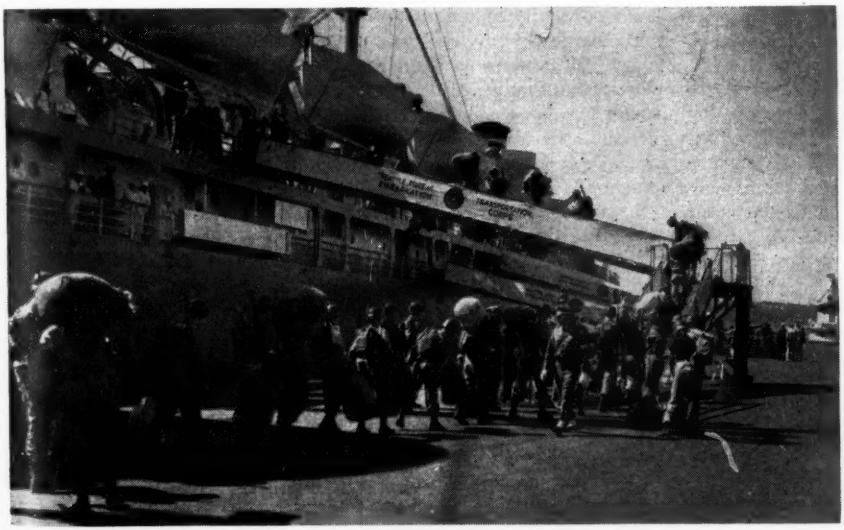
It is realized that, even with a unit replacement system in effect, some individual replacements still will be required. Each unit will receive approximately 2 percent of its strength each month in replacements. This number of new and untrained personnel can be absorbed easily into a unit. At no time, however, will this turn-over be great enough to affect materially the efficiency of the unit.

It was stated earlier that there are several ways in which we can augment our overseas garrisons. One of the most obvious is to call National Guard divisions into Federal service. There are, at this time, six National Guard divisions on active duty. These divisions are allo-

cated on a population basis and are recruited from specified localities. Why should we not equalize this duty? By using unit rotation, we can call additional divisions into service as older ones finish their terms. Such a system not only will maintain the structure of the National Guard, but it will also provide those periodic tours of extended service which will ensure a large, well-trained, capable reserve in the event of full mobilization.

Napoleon stated that the morale is to the physical as three is to one. How will *esprit* be affected by unit rotation? Those in personnel management emphasize continually the desirability of keeping units knit organizations. Korea has illustrated that morale stems from a man's pride in his outfit, and that such pride is engendered by a high state of training and a belief in one's self and in his fellows. All of these requirements are met better by unit rotation than by filling the gaps with individual replacements. In unit rotation, a soldier trains in the Zone of Interior, serves on foreign soil, and returns to the United States in the same unit and with the same friends. When he leaves active service, he remembers his unit and the people in it, and not the bleak homelessness of the replacement pipe line.

Another vital consideration in these



Reminiscent of World War II, troops, bound for duty at an Army base in the Pacific, board a naval transport at the Seattle Port of Embarkation.—Department of Defense photo.

together. It is even planned to have replacement platoons shipped as units all the way from replacement centers to combat regiments so that the soldier always will be among friends. Field commanders reiterate the desirability of having well-

days of high prices is "how much will it cost?" Because we have decreased the individual's overseas time, it will be necessary to move more troops. However, cost cannot be measured in how much is spent. Rather, it is determined by the cost as

compared to the returns received. In unit rotation, troops are moved directly from home stations to their destination. Processing, screening, and organizing are all accomplished as a matter of routine administration during the training period. Delays at staging areas and at ports of embarkation are obviated. While a few days' delay appears to be a matter of slight consideration, it should be noted that one unproductive day of an infantry regiment costs the country $41,514. An unproductive day of an overseas theater division slice costs $440,000. The time wasted in unnecessary processing of replacements at a port soon amounts to astronomical figures. All this money is chargeable to overhead; there is no return. By moving a processed unit as an entity, this unproductive time is saved. More days are available for training. The country receives more for its money.

If an overseas garrison consisted of divisions only, it would be necessary to keep shipping standing by to lift the peak loads. However, a theater of operations' division slice is 40,000 men. Of this number, less than 19,000 are organic to the division. Shipping needs, therefore, are not dictated by the divisions alone for supporting units will more than take up the slack.

Conclusions

The United States is committed to the task of furnishing large garrisons overseas for a long period of time. The strength of these garrisons must be measured in terms of their combat readiness, not in the number of people on the unit rolls.

The high rate in personnel turn-over in foreign garrisons, caused by the individual replacement system now in effect, prohibits those forces from maintaining a high standard of training. The unit replacement system gives us a method which provides well-trained units with high morale and *esprit*. It is fitted to the situation being encountered today. Its efficiency can be measured by results—a long-term, combat-ready force capable of protecting the Nation and themselves, whenever necessary.

We do feel . . . that the greatest contribution the Army can make to our Nation's security is the continuing provision of effective forces which will serve as vigorous and forceful examples to the free peoples of the world, as vigorous and forceful restraints upon predatory states, and if the need should arise, as forces that can be rapidly built up to defeat any aggressor.

General J. Lawton Collins

Amphibious Operations On Navigable Rivers

Exploitation of Rivers in the Mindanao Campaign

Lieutenant Colonel Karl Conner, *Artillery*
Instructor, Command and General Staff College

A GREAT deal has been written about operations at river lines, including the tactics of crossing a river, the methods of defending a river line, and the use of rivers to provide flank security. Also, the lessons learned and the techniques employed in the large-scale amphibious operations of the last war have received much attention in military publications. However, amphibious techniques were used in a number of operations on navigable rivers during World War II—operations in which the river did not assume its normal role as an obstacle, but served as an avenue of advance to objectives in the enemy's rear or as a main supply route for the movement of logistical support. It is the object of this article to show how, under certain circumstances, navigable rivers have been exploited in tactical and logistical operations to aid in the defeat of a less mobile enemy.

Military operations on navigable rivers were so rare in Europe after the close of the Dutch wars of independence, in 1584, that Clausewitz wrote only of the problems of crossing and defending rivers. However, the absence of good land routes in America, during the French and Indian War and the Revolutionary War, forced military units to use rivers and lakes both as avenues of advance and routes of retreat. Again, in the Civil War, even larger scale military operations were conducted on the Mississippi River. In 1937, the Japanese operations against Shanghai and, later the same year, the opening of their campaign up the Yangtze River served as a proving ground for the development of Japanese amphibious techniques employed later in their operations in the Pacific.

River operations generally have resulted from a lack of land transportation facilities or a dependence on water transportation to maintain the mobility of military forces. However, in many undeveloped areas of the world, rivers still provide the principal avenues of travel, and military forces, operating in these areas, must be alert to the possibility of exploiting navigable rivers.

To illustrate the exploitation of navigable rivers in military operations, the campaign of the United States X Corps on the island of Mindanao in the Philippine Archipelago has been selected. The following account of operations on the Mindanao and the Agusan Rivers is presented to show how these rivers provided a faster and better route to critical objectives deep in the enemy rear, and how

In many undeveloped areas, rivers provide the principal routes of communication. Military forces, operating in such areas, must be alert to the possibility of exploiting navigable rivers to move men and supplies

these rivers later were employed in the logistical support of forces operating against the enemy.

General Situation

By the early spring of 1945, the task of clearing the Japanese from the Philippines was well under way with the island of Mindanao the only large area remaining in their hands. Zamboanga, at the southwest tip of the island, was seized, in March 1945, by the United States 41st Infantry Division to provide an air base to cover operations on the remainder of the island.

The island of Mindanao (Figure 1), about the size of Pennsylvania, has very rugged terrain, most of which is heavily forested. However, many swamps are found in the lowlands. The Japanese civilian population of Mindanao was centered in the Davao area, on the southeast coast, and the area south of Bugo, on the north coast. The defending garrison on Mindanao, less the Zamboanga Peninsula, was estimated at about 30,000, with 18,000 reported in the Davao area. Of this total number, approximately 19,000 were in combat or base defense (naval) units, and 11,000 were in service units. In addition, an estimated 3,000 to 6,000 poorly armed Japanese civilians, conscripted residents of Mindanao, were present on the island. The two principal combat units were identified as the 30th and 100th Divisions. The enemy had had 3 years to prepare against an attack, an attack he expected to come from the sea, directly at Davao. Most of his guns and defensive installations, therefore, faced the Davao Gulf so that a frontal assault there would have been very costly.

Because of the excellent landing strip at Malabang, on the west coast, which was considered necessary to provide air support for operations on Mindanao, and the extensive defenses in the Davao area, plans were made for an assault landing in the Moro Gulf with D-day set as 17 April 1945. The Lake Lanao area to the north of Malabang, throughout most of the war, had been in the hands of Filipino guerrillas, with this control extending close to the Malabang airstrip. By landing in this area where there would be a minimum resistance, the X Corps anticipated establishing a base from which it then could move on the strongly occupied areas of Davao and Bugo.

The main road system of the island favored an advance from the Malabang—Parang—Cotabato area southeastward to the village of Kabacan, along a prewar road known as Highway No 1 which generally was parallel to the valley of the Mindanao River. Highway No 1 extended from Parang, on the Moro Gulf, to Digos, on the Davao Gulf, and thence along the coast through Davao. At Kabacan, Highway No 1 met the Sayre Highway which extended to Bugo on the north coast. In prewar days, most of the main roads on the island were well graded, fairly well drained, and cobbled for about 9 feet in the center. However, many of these roads had become overgrown because of a lack of maintenance during the Japanese occupation, particularly in the Malabang—Parang section which apparently had reverted to the jungle.

The Japanese strength at Malabang was known to be light, and in the Parang—Cotabato area there was believed to be about one battalion. The distribution of forces in the interior was not known definitely, beyond the fact that troops were reported to be along the main highways.

The force designated for the Mindanao campaign was the X Corps, consisting of the United States 24th and 31st Infantry Divisions and approximately 20,000 corps troops, including the 533d Engineer Boat and Shore Regiment of the 3d Engineer Special Brigade. The 24th Division, with the boat and shore regiment attached, was scheduled to make the initial assault.

Plans for Initial Landing

The 24th Division's plan for the landing at Malabang was for the 19th Regimental Combat Team (RCT) to land on the beaches on the south part of the division landing area and block off Malabang and the airfield on its north flank, while one battalion advanced rapidly to the south along the road to seize Parang. The 21st RCT was to land on the north part of the division landing area, seize the Malabang airfield, contact the guerrillas to the north, and establish a beach suitable for the landing of LSTs (landing ship, tank). The 34th RCT, held afloat at Zamboanga, was to land at Parang on D plus 2, in the beachhead which it was believed would be established by that time. The 31st Division was to be committed about D plus 6, probably landing at Parang.

The possibility of the use of the Mindanao River as a supply route was considered during the planning phase, but no definite corps and division plans were made for clearing the river until the arrival of the force in the objective area. Because of the reported presence of several small, one-man suicide torpedo boats, the naval commander was reluctant to provide for the early reconnaissance of the two mouths of the Mindanao River. The division commander, therefore, tentatively assigned this mission to the boat and shore regiment, with the provision that final orders would be issued only after Parang was secured.

The principal components of the expeditionary force were scattered over a wide area, and they were embarked at points extending from Luzon, Leyte, and Mindoro to Morotai and were only assembled completely after the convoy was under way to the objective area.

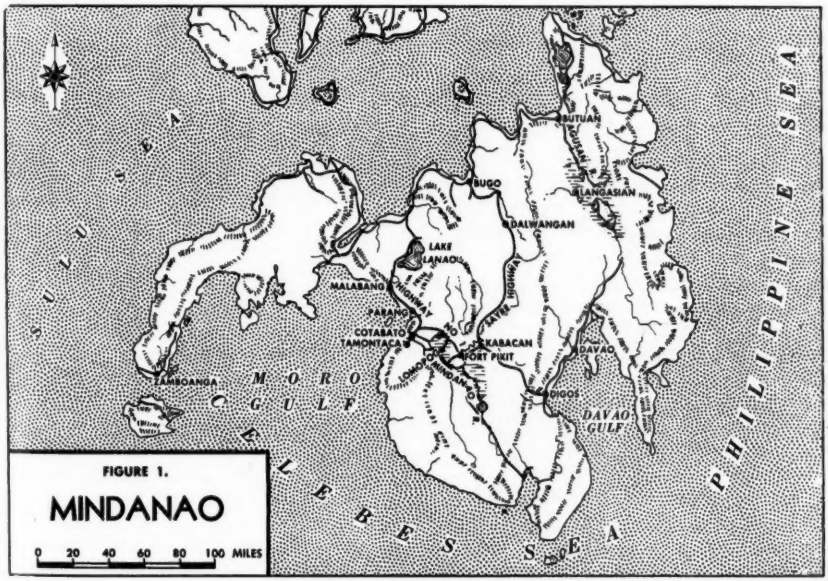


FIGURE 1.
MINDANAO

Changes in Plan

Thirty-six hours before the scheduled assault, and after the departure of some of the elements of the force from Leyte and Mindoro, information was received that the Malabang airport had been seized by the Filipino guerrilla forces. The corps commander, therefore, directed that the initial landings be made at Parang, about 20 miles to the southeast of the original landing area. This required that major changes be made in the plans of all units in the assault, and that subordinate units be notified while the convoy was approaching the objective area. The revised division assault plan called for the 19th RCT to land at Parang, with the mission of moving out immediately on the road to the southeast, and the 21st RCT, less one battalion, to follow over the same beaches. One battalion of the 21st RCT was to land in the vicinity of Malabang to ensure the seizure of the airport.

In spite of the major changes in plans for the assault, the landing at Parang commenced at 0900 on 17 April and was executed successfully with resistance on the beach practically nonexistent. The leading elements immediately moved out to the southwest to secure Parang and the high ground controlling the harbor. Reconnaissance to the east encountered light resistance, although there was evidence that sizable enemy forces recently had withdrawn, and most of the bridges in the area had been destroyed.

Operations on the Mindanao River

At 1700, on D-day, the division commander decided to seize the Cotabato—Tamontaca area (Figure 2) by an amphibious assault because the destroyed bridges on Highway No 1 were hampering seriously the southward advance of the 19th RCT. For the operation on the river, the division commander formed a task force consisting of the 2d Battalion, 21st Infantry, the gunboat elements of the engineer boat and short regiment, and sufficient craft from that regiment to transport the infantry battalion. The initial objective was set as a line about a mile east of the two towns.

The plan of attack called for a simultaneous forcing of both river mouths by two convoys which would proceed independently up each branch of the river. The north convoy, which was to seize Cotabato, consisted of two LCMGs (landing craft, merchanized, gunboat); one LCMR (landing craft, mechanized, rocket); one LCS(S) (landing craft, support, small); with the 2d Battalion, 21st Infantry (less Companies "E" and "F"), embarked in LCMs (landing craft, mechanized) and LCVPs (landing craft, vehicle, personnel). The south convoy, which was to seize Tamontaca, consisted of three LCMGs, two LCS(S)s, and Company "E," 21st Infantry, embarked in LCMs and LCVPs. No assistance from the 19th RCT advancing along the highway from Parang could be expected until D plus 2. However, one cruiser, one destroyer, and two flights of *B-25s* were to support the operation, controlled through JASCO (Joint Assault Signal Company) elements attached to the task force.

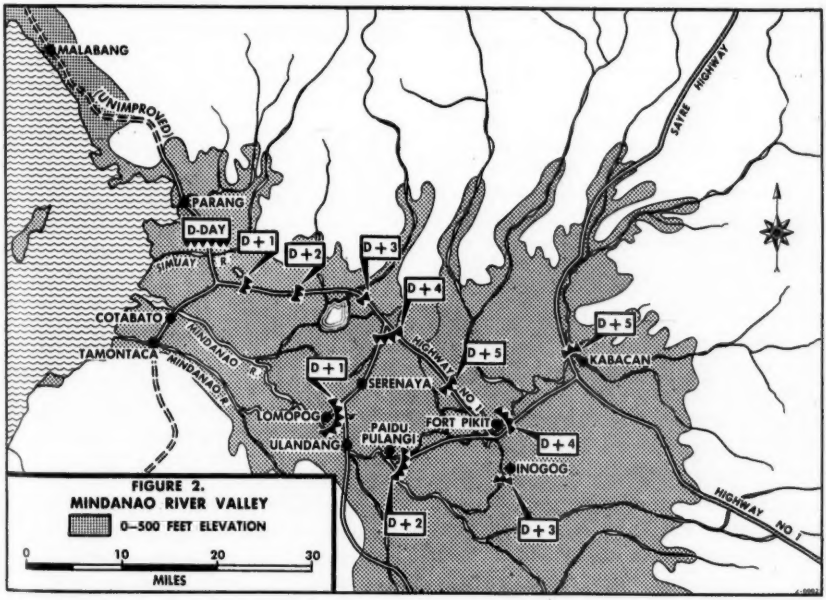
The mounting of the Mindanao River task force was complicated by the fact that the planning conference did not break up until after dark (D-day), by a heavy rain which commenced at sunset and continued all night, and by the crowded condition of the beach over which troops and supplies of the assault convoy were still unloading. However, boat teams were formed, assault waves were organized, and all troops were embarked by 0030.

At 0900, on D plus 1 (18 April), the two assault groups started upstream and, after intensive naval gunfire, gunboat fires, and air bombardment were placed on the two towns, the initial objective was reached without opposition. Troops landed at both towns without making contact with

the enemy. Patrols were sent out to secure the area between the two rivers and to reconnoiter north of Cotabato toward Highway No 1. The capture of the Cotabato area, on D plus 1, marked the occupation of the corps D plus 5 objective, 4 days ahead of schedule.

The situation indicated that the enemy in the area was disorganized and unprepared to oppose the movement up the river. As a result, the northern gunboat detachment and a reinforced rifle company (Company "F," 21st Infantry) advanced up the north branch, while the southern gunboat detachment and a reinforced rifle platoon from Company "E," 21st Infantry, advanced up the south branch. This advance was opposed on the south branch, by only a handful of the enemy, but this resistance dissolved after a brief bombardment employing the automatic weapons of the gunboats.

At 1350, on D plus 1, the two forces met at the point where the Mindanao River separates into its north and south branches. A reconnaissance of the area indicated no suitable defensive position, so a further reconnaissance upstream was ordered. Local residents reported 200 Japanese possessing automatic weapons dug in at Lomopog, but it was decided to assault the town since it controlled the first river-road junction above Cotabato, and its possession would enable friendly units to attack the rear of enemy units opposing the overland advance of the 19th RCT eastward along Highway No 1. Since the naval guns were out of range and air support was not available, the gunboats were deployed so as to bring the maximum number of weapons into action simultaneously, and a heavy concentration was placed on the town.



By 1700, on D plus 1, troops landed in Lomopog, 22 miles upriver from the battalion base at Cotabato. Although no enemy

opposition was encountered, evidence was found indicating that the enemy had withdrawn shortly before the landing. A perimeter defense was organized, the gunboats deployed in its support, and a reconnaissance patrol was dispatched along the road to Serenaya to determine the condition of the road and to locate enemy forces in the area. During the night, enemy forces crossed the river in canoes, both upstream and downstream from the force at Lomopog, and retreated to the north.

On D plus 2 (19 April), a patrol from Company "F," 21st Infantry, was sent north from Lomopog along the road through Serenaya to the main road in front of the 19th RCT (Figure 2). The platoon of Company "E," 21st Infantry, was embarked in LCMs to accompany the gunboats on a reconnaissance upstream to Ulandang. This force landed at Ulandang at 1030, to find that the enemy had left only 90 minutes previously, abandoning a large store of arms and supplies. A reconnaissance along the road north and south of the river, at Ulandang, indicated that it was in very poor condition. In view of the apparent disorganization of the enemy, the river force commander decided to push on to Paidu Pulangi to secure it as a base for a drive on Fort Pikit. After a brief gunboat bombardment, Paidu Pulangi was occupied at 1300, and evidence again was found of the rapid departure of the enemy defenders.

The infantry platoon then was withdrawn to Lomopog on orders from division headquarters, but, in view of the strong captured position in the Paidu Pulangi area, the gunboat force commander decided to defend this area with the crews of the gunboats. The seizure of Paidu Pulangi represented an advance inland of 43 miles from the mouth of the river in only 31 hours. The rapidity of this advance helped keep the enemy off balance, and was instrumental in preventing his establishment of strong defensive positions in front of the overland force.

On D plus 3 (20 April), both the river garrison at Lomopog and the one at Paidu Pulangi engaged in aggressive patrolling. A patrol from the Lomopog garrison encountered a strong enemy force and was heavily engaged with mortars and machine guns until darkness, when it returned to the garrison at Lomopog. Meantime, the force at Paidu Pulangi had received information from natives that a guerrilla headquarters was located a short distance upstream. Two gunboats were dispatched to make contact and get reinforcements. This force traveled 18 miles upriver before locating the command post of the 2d Battalion, 118th Infantry (Filipino), at Inogog.

Meanwhile, the division was rushing reinforcements upstream as fast as they were unloaded from the D plus 2 shipping at Parang, and plans were being made to concentrate these troops at Paidu Pulangi, on D plus 4, for an assault on Fort Pikit the following day. The 3d Battalion, 34th Infantry, reached Lomopog on D plus 3, and continued on to Paidu Pulangi on D plus 4.

On D plus 4 (21 April), it was decided to make an overland and an amphibious assault on Fort Pikit from Paidu Pulangi, using one company of the 3d Battalion, 34th Infantry, afloat, and the remainder of the battalion overland. Both forces moved out from Paidu Pulangi at 1100. The river force had, by this time, been reinforced with three Navy PGMs (patrol gunboat, medium—converted 110-foot subchasers). The river force arrived at Inogog where information was received from the 118th Infantry (Filipino) that Fort Pikit was defended by a force of approximately 800 Japanese. Plans were altered, and the infantry company was landed some distance below the town to avoid enemy fire while debarking. The gunboats then were formed in two columns, each headed by a

PMG, and proceeded upstream where they bombarded the reported enemy positions, receiving only light small-arms fire in return. The PGMs were forced to stop some distance short of Fort Pikit because of a wrecked bridge, but, after the bombardment, the gunboats landed at Fort Pikit

LCMGs nearing the Dulanuan-Ulandang area 36 miles up the Mindanao River.

and a patrol, formed from gunboat crew members, occupied the town and a high hill which dominated the area. Stores of enemy arms and equipment and evidence of the hasty withdrawal of enemy forces were found again. The infantry company, which was landed downstream, and the remainder of the battalion, proceeding overland, arrived at Fort Pikit soon after its capture, without having encountered any enemy resistance en route. On the night of D plus 4, the regimental headquarters and another battalion of the 34th Infantry arrived at Fort Pikit in LCMs, and plans were made for another land and amphibious attack on Kabacan the next day. The seizure of Fort Pikit and the Pikit Ferry cut the escape route of the enemy forces retreating before the overland force on Highway No 1, forcing them to dispose into the mountains north of the highway.

On D plus 5 (22 April), three gunboats proceeded upstream at daylight toward Kabacan, while the 3d Battalion, 34th Infantry, moved overland along the road on the south bank of the river. By 1350, the infantry battalion had secured the important road junction of the Sayre Highway and Highway No 1. A patrol dispatched toward Kabacan encountered an enemy force, so it was decided that the battalion would remain in the vicinity of the road junction and attack the town next morning. The gunboats, meanwhile, were having considerable difficulty in moving upstream due to the shallow water in this section of the river. The gunboats encountered an enemy detachment below the ferry, killed three and scattered the remainder, and secured the ferry without further opposition. Early the next morning, the infantry battalion arrived and occupied the town of Kabacan.

Meanwhile, the progress of troops advancing overland from Parang was hampered by enemy resistance, by a road that was overgrown for long stretches with tropical forest, by demolished bridges often located only a few hundred yards apart, and by the excessive heat which

LCMGs pouring rockets and 40-mm shells into enemy positions outside of Lomopog.

caused many cases of heat prostration. However, the 19th RCT completed the 42-mile, overland march from Parang to Fort Pikit on 23 April (D plus 6), and took over the security of this area. Construction crews of the division engineer had been working day and night to rebuild bridges

and construct bypasses, so vehicles could keep pace with the infantry column. The subsequent movement of the 21st RCT, up the river from Cotabato, was accomplished in LCIs (landing craft, infantry) to further exploit the captured river highway.

Results of the Operation

The planners of the Eighth Army had predicted that 14 to 30 days would be required to dislodge the enemy from the Mindanao River Valley and secure the critical Kabacan area. However, the task was accomplished in 6 days. Since Kabacan was the junction of the central Mindanao east-west and north-south highways, its seizure, according to General MacArthur, "cut the Japanese forces in Mindanao in half," leaving the Japanese 30th Division on the north and the Japanese 100th Division on the east, thus rendering these units incapable of further mutual support. The 24th Infantry Division continued its attack overland in the direction of Davao, reaching the Davao Gulf, in the vicinity of Digos, on 28 April (D plus 11), having traveled approximately 130 miles to cross the island. The 31st Infantry Division was moved to Kabacan, using the river and Highway No 1, and attacked north along the Sayre Highway toward Bugo.

The delay in clearing the road, the extensive enemy destruction of bridges, and the magnitude of the task of rehabilitating the overland route, with the engineer equipment and personnel available, required that the bulk of the reinforcements and supplies be moved from Cotabato to Fort Pikit on the river. The channel was too narrow and, in some places, too shallow for the use of larger landing craft, so the task was performed mainly by LCMs. During the period 20 April to 28 April, three regimental combat teams, a division headquarters, and a battalion of artillery, each with at least 3 days of supply, were ferried 68 miles over water from Parang to Fort Pikit. The LCMs also operated ferries at Cotabato, Fort Pikit, and Kabacan to relieve the already overworked engineers of the task of constructing bridges at these sites. In the first 20 days of the campaign, more than 300,000 ton-miles of cargo were carried on the river, with the tonnage delivered at Fort Pikit exceeding 500 tons on some days. Throughout May, the river traffic continued with increasing difficulty as the water level dropped, and boats were withdrawn for employment elsewhere.

In May, bases were opened on the Davao Gulf to support the 24th Infantry Division's operations in that area. However, support for the 31st Infantry Division, moving north along the Sayre Highway, was moved on the Mindanao River, until a juncture was made with the forces operating south from Bugo.

Operations on the Agusan River

On 23 May, leading elements of the 31st Infantry Division, moving north along the Sayre Highway, effected a juncture, near Dalwangan, with the 108th RCT of the 40th Infantry Division, which had made a landing at Bugo (Figure 3). The entire Sayre Highway now was under friendly control, leaving the remaining enemy in Mindanao only trails and jungle for use in his retreat to the mountainous region east of the highway. However, one large, apparently organized group of Japanese was observed, by aerial reconnaissance, to be headed eastward toward various mountain passes leading to the fertile valley in the upper reaches of the Agusan River, where they would be difficult to destroy. To block the enemy forces from reaching the Agusan River Valley, the X Corps Commander ordered the 1st Battalion, 155th Infantry (reinforced with gunboats and craft from the 533d Engineer Boat and Shore Regiment), 31st Infantry Division, to move overwater 75 miles from Bugo to Butuan Bay, and then south 100 miles up the Agusan River.

The 1st Battalion, 155th Infantry, em-

barked at Bugo on 24 June, and, on 27 June, landed at Sagunto. The initial movement upstream was made by a small advance scouting force of gunboats, followed by the reinforced infantry battalion in LCMs. Aside from the delays caused by the strong currents, and damage to boats by floating logs, the movement upriver was uneventful. On 30 June, the force pushed on to Langasian where the gunboats were used to disperse an enemy force. In the next few days, the infantry occupied key positions in the area, thereby denying it to the enemy. The river was used to move the logistical support to the forces in the Agusan River Valley for 2 months. It required from two to three full days to make the trip from the mouth of the river to the landing point at Langasian, and the narrow channel, shallow water, and floating snags made the maintenance of the boats a difficult task.

Problems of Division Commander

The problems confronting the Commanding General, 24th Infantry Division, included:

1. *Employment of small craft.*—The division commander was forced to decide between using the available craft to unload the ships of the assault convoy that could not be beached, or diverting them to the Mindanao River operation. In this matter, he was fortunate in that the boat and shore regiment was attached to his division, and sufficient craft were available that could be employed however he decided. Had the boats not been under division control, the division commander might have had difficulty in persuading the naval commander to delay the unloading of the assault convoy by diverting craft to the river operation, as well as to relinquish naval craft to army command for such uses.

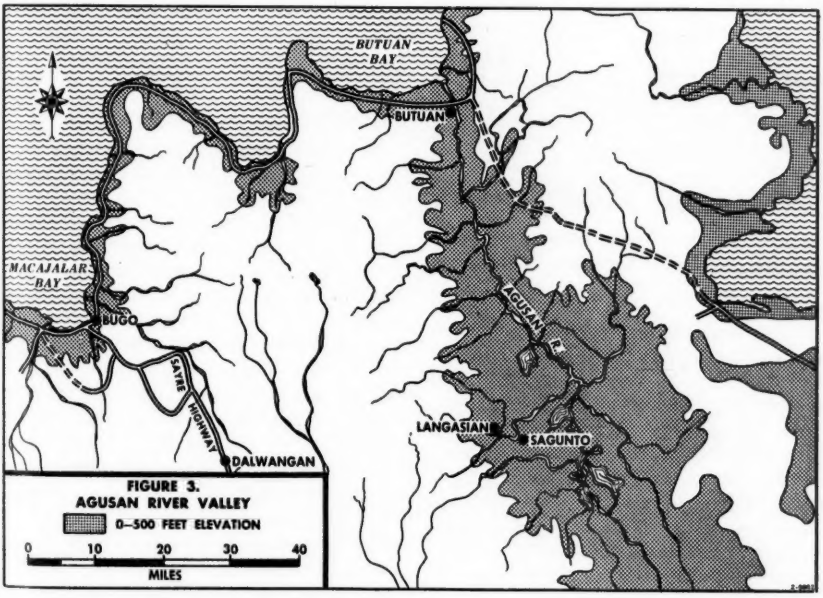


FIGURE 3.
AGUSAN RIVER VALLEY
0–500 FEET ELEVATION

2. *Speed versus overextension.*—As soon as it became apparent that the Mindanao River was not heavily defended by the enemy, the division commander was forced to decide between advancing the small force at Lomopog independently, as rapidly as possible, toward the Kabacan objective, or holding the vital road-river junctions in sufficient strength to prevent the enemy from organizing defensive positions across the route of the overland force.

PGMs firing their 3-inch guns into enemy positions just below the Fort Pikit Ferry.

3. *Vulnerability of river routes of communication.*—Since a small force could disrupt traffic on the river at many places, the division commander had to decide between slowing his advance, so that he could clear out the many small bypassed enemy units, or maintaining his rapid advance, on the assumption that the bypassed enemy was so disorganized that infiltration could not effectively disrupt operations along his long supply route.

Requirements for River Operations

In order to conduct amphibious operations on navigable rivers successfully, the following must be available:

1. *Suitable water transportation.*—Landing craft of the LCM class were found to be the most satisfactory for operations on the Mindanao River because, with their twin screws, they were much more maneuverable than the single screw LCVP. LVTs (landing vehicle, tracked) were found to be too slow to cope with the river current, and difficulty was encountered in negotiating the numerous silt bars located in shallow water.

2. *Assault troops trained in amphibious techniques.*—Because of the rapidly changing situation in the river operation, it was essential that the assault troops be thoroughly familiar with the techniques employed in the more conventional amphibious operations. Because of previous amphibious experience, the assault troops employed on the Mindanao River were prepared for their rapid organization into boat teams for each specific mission and yet proved capable of aggressive operations ashore, with limited support from improvised and unconventional sources.

3. *Suitable supporting weapons.*—All of the boat and shore regiment's LCMGs employed on the Mindanao River were LCMs modified after the unit arrived in the theater, and armed with weapons procured in the field. These gunboats were equipped with various combinations of American 20- and 40-mm antiaircraft guns, Japanese 20- and 25-mm naval antiaircraft guns, 4.5-inch rocket launchers, and .30- and .50-caliber machine guns. Because of their shallow draft, these LCMGs were able to operate in all but the lowest water, and their armament gave the forces operating on the river essential fire support.

4. *Adequate signal communications.*—In order to exploit the Mindanao River as an avenue of approach, efficient and dependable signal communications facilities were essential to co-ordinate the movement of the river force with those of the forces operating overland. Since the gunboats used in Mindanao also were the command and control boats of the boat companies and the boat battalion headquarters, they were equipped with excellent communications facilities.

5. *Disorganized enemy.* — The rapid movement up the Mindanao River might not have been possible against a well-organized, determined enemy disposed to defend along the riverline. However, his failure to defend along this line, and the speed of the advance up the river, disrupted his entire defense of the Mindanao River Valley. As a result, the enemy was kept off balance for all operations in this area.

Conclusions

In many undeveloped areas of the world, navigable rivers still provide the principal routes of communication. Military commanders operating in such areas must be prepared to exploit rivers to the maximum so as to maintain their tactical mobility and to move logistical support to forces operating on land. To be able to take advantage of river routes of communication, a commander must foresee the possibility of such operations, and have the necessary equipment and properly trained troops available at the proper time and place.

Only one military organization can hold and gain ground in war—a ground army supported by tactical aviation and with supply lines guarded by a navy.

General J. Lawton Collins

The tactics of amphibious operations have usually been able to respond to the character of the weapons that confronted them. I think that will continue. It is inevitable that tactics will conform to the situation and take into account the weapons that the enemy has.

Admiral Forrest P. Sherman

12th Army Group Plans and Operations for the Rhine Crossing and the Closing of the Ruhr Pocket

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This paper was presented to the student body of the Army War College, Fort Leavenworth, Kansas, on 5 January 1951.—The Editor.

Early Planning

THE Combined Chiefs of Staff directive to General Eisenhower stated, simply, "You will enter the continent of Europe, and, in conjunction with other Allied nations, undertake operations aimed at the heart of Germany and the destruction of her armed forces." Operation *Overlord* provided only for the execution of the first part of this directive, the "securing of the initial lodgement area" in northwest Europe between the Loire and Seine Rivers. Early in May, the Supreme Headquarters, Allied Expeditionary Forces (SHAEF), planning staff sent to the 12th Army Group for comment the draft of a broad general plan for operations aimed at the heart of Germany. This plan called for a main effort up the Channel coast to cross the lower Rhine and seize the Ruhr, and a subsidiary advance in the direction Verdun-Metz. It forecast the seizure of the Ruhr on D plus 330.

At the working level, we of the 12th Army Group planning staff talked this over with Brigadier McLaine and his planning group at SHAEF's big field headquarters at Widewing. SHAEF, while agreeing that Berlin was the ultimate goal, felt that it was too far east to be an objective of a campaign in the west. They also believed that with the capture of the great industrial center in the Ruhr Valley, Germany would fall. The 12th Army Group, feeling that the strategic air effort had reduced the value of the Ruhr to the point where its capture would not be decisive, believed Berlin to be the "heart of Germany" and the major objective. We also maintained that a major effort through the Low Countries, where the river barriers were so much more formidable and the country subject to flooding, would be more costly than an offensive south of the Ardennes. Another objection that we had to this plan was that it gave the 12th Army Group the subsidiary mission and the 21st Army Group, reinforced with an American army, the main effort.

What discussion, if any, went on at the top level concerning this plan, I do not know. However, the plan as submitted was never published. Nevertheless, the basic concept expressed in this draft influenced SHAEF and 21st Army Group thinking until the Rhine had been crossed in March 1945.

'Blueprint for Victory'

Within 10 days of the break-out at Avranches, it was evident that the enemy in Normandy was defeated, and it would be only a matter of days until we reached the Seine. General Bradley based his plan for future action on the knowledge that the German Fifteenth Army, though depleted by last minute futile reinforcements

of the Normandy front, was a fresh, cohesive force in the Pas de Calais area, capable of effecting considerable delay to an advance along the Channel coast. The bulk of General Patton's Third Army, on the other hand, was in hot pursuit of confused and disorganized remnants of some six or seven German divisions which had abandoned much of their equipment in their flight to the east. By relying on our superior mobility to continue this pressure to overrun or to prevent these remnants from being organized for a defense, it was believed that the Rhine could be reached before any resistance could be organized to defend it. The supply situation admittedly was strained, but because of the type of action it was engaged in, the Third Army was expending little more than fuel and rations.

This plan, known to us as the "Blueprint for Victory," called for the advance of the Third Army to the Neufchateau-Toul area while the First Army, encircling Paris, moved to the Reims area. In deference to the logistical situation, the armies were to continue their rapid advance from these areas only with armored-motorized columns (about six divisions in all), to seize crossings of the Rhine River between Strasbourg and Mainz, inclusive.

'Blueprint' Rejected

General Eisenhower was impressed favorably with this plan when briefed at our tactical headquarters, at Poilley, on 18 August, and we prepared to publish it. Due to the fact that our headquarters displaced to Laval, on 20 August, the maps and the mimeographed text of the plan did not get together until that evening. Meanwhile, General Patton came to Laval to propose to General Bradley a similar line of action employing only the Third Army. In General Bradley's absence, General Patton was briefed on the "Blueprint" and departed, highly pleased. However, when General Bradley arrived at Laval, following a conference with the SHAEF advance group at Granville, he announced that the "Blueprint" had been rejected. The 21st Army Group, with the bulk of the logistical support, was to carry the main effort up the Channel coast. The 12th Army Group, with its main effort on the left, would support the advance of the 21st Army Group. After securing the port of Antwerp, the Ruhr was still the final objective.

One vestige of our plan remained. The Third Army, within the limitations imposed by the logistical situation, would advance to the east. To prevent that becoming a major effort, however, it was directed that the priority of supply be "to the First Army in initial reserves and maintenance for this operation." Nevertheless, because of superb supply discipline and the great resourcefulness of General "Maud" Muller, its G4, the Third Army crossed the Meuse and had reconnaissance elements across the Moselle, in Metz and beyond Nancy, on 3 September. But lack of fuel prevented the reinforcement of these units, and the enemy, seizing the first opportunity to reorganize since the breakout in Normandy, drove these light elements back.

The encirclement of the Ruhr, the greatest in history, in which more than 325,000 prisoners were taken, is an excellent illustration of the flexibility and adaptability which must exist in all military planning

It is useless to speculate, at this time, but one cannot help wondering what might have happened had the Third Army continued to receive the gasoline which had been flown in to it regularly from Britain by the Troop Carrier Command. This

support was withdrawn in preparation for an abortive airborne operation in the Tournai (Belgium) area, which was overrun by the First Army's troops the day before the drop was scheduled.

But the Allied Airborne Army was not long to be denied its chance to join the fight. In a desperate attempt to cross the Rhine—this time in the Nijmegen-Arnhem area—the costly Operation *Market* was ordered. So the Allied drive spent its force and came to rest against the Siegfried Line and along the Moselle River, and the chance to cross the German Rhine before winter was lost.

During the ensuing dreary, bitter, fall months, each operational directive hopefully cited Rhine crossings as objectives, but we all knew that there was much hard fighting to be done before these objectives could be attained. With the capture of Antwerp intact, on 5 September, the logistical planning was revised and every effort was directed toward the opening of this port. However, the dogged defense of the Schelde Estuary, which was not cleared until 9 November, was more effective in denying us the use of the port than extensive demolitions would have been. The net result was that the logistic crisis, which halted the Allied advance early in September, was not improved materially until mid-November. It would be late in December before the Allies could mount a general offensive. Meanwhile, planning and preparation were going ahead.

The Maastricht Conference

At a high-level conference, at Maastricht, on 7 December, attended by General Eisenhower, Field Marshal Montgomery, and General Bradley, the following transpired:

1. It was agreed that:

a. Pressure would be continued throughout the winter to drive the enemy back to the Rhine.

b. The primary objective would be to cut off the Ruhr.

c. The main attack should be north of the Ruhr.

2. General Eisenhower decided that the 21st Army Group, reinforced by a strong United States army, would have the main effort.

3. Disagreeing with Field Marshal Montgomery's contention that he control all troops north of the Ardennes, General Eisenhower drew the boundary between the army groups through the Ruhr.

4. Field Marshal Montgomery would not agree to any effort south of the Ruhr on the Frankfurt-Kassel line, as suggested by General Bradley. However, General Eisenhower directed General Bradley to investigate the relative merits of the Bonn and Frankfurt crossings.

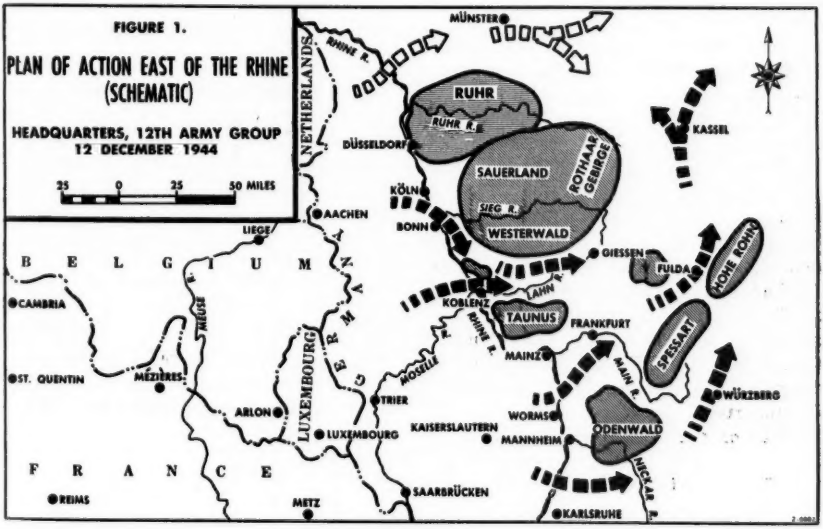
The G3, SHAEF, set 1 January as a target date for these operations.

Plan for Operations East of the Rhine

A 12th Army Group plan for operations east of the Rhine had been prepared on 5 October. Modified to bring it up-to-date with the current situation, as of 12 December, and to conform with the Maastricht decisions, this plan (see Figure 1) was approved by General Bradley as a basis for the discussion of operations to take place at a conference scheduled by SHAEF, in Versailles on 19 December. The plan called for crossings of the Rhine by the First Army between Koblenz and Köln. Avoiding the rough Sauerland and Westerwald, the advance was planned up the east bank of the Rhine and up the valley of the Lahn into the Hessian Corridor. The Third Army was to cross the Rhine between Worms and Mainz, and cross the Main in the vicinity of Frankfurt. The parallel advance of both armies, up the Hessian Corridor, was to continue to the Kassel area, where contact was to be made with the 21st Army Group forces encircling the Ruhr from the north, and thence launch a co-ordinated drive on Berlin.

Our logistical planners gave 31 January 1945 as the date when sufficient ammuni-

tion and supplies, including necessary engineer bridging equipment, would be available to support this operation and that of the United States Ninth Army which, though under the operational control of the 21st Army Group, was to remain under the 12th Army Group for administrative and logistical support. The engineers, on the other hand, stated that because of ice packs and floating ice in the Rhine during January and most of February, crossings during those months would be hazardous. February and March were low flow months, while the melting snows in the Alps would cause floods and increase current velocities



from April to a peak in mid-July. Since the river would be ice-free after the month of February, and flood-free during March, they concluded that March was the most suitable month, in fact, the only suitable month, for crossing the Rhine prior to late summer or early fall.

General "Pat" Timothy, the 12th Army Group Engineer, and I took these plans to Versailles, but, because of the German offensive which had started in the Ardennes 3 days earlier, there was no apparent urgency for reaching agreements on the Rhine crossings, and the conference was brief and inconclusive. Our proposals for crossing the Rhine south of the Ruhr, however, were received very coolly by the 21st Army Group and SHAEF.

Since 25 August, the Third Army zone of operations had included the Mannheim-Koblenz reach of the Rhine River. Plans for crossings in this area had been prepared, and large dumps of bridging equipment amassed in the vicinity of Toul. The First Army, which had been assigned Rhine crossing objectives in the vicinity of Koblenz, Bonn, and Köln since 10 September, had prepared crossing plans and were stock-piling bridging equipment in the area behind Aachen.

Because of the German offensive, however, boundaries had been shifted to the north in late December. When the "Bulge"

had been reduced and we focused again our attention on the Rhine, both armies found themselves faced with a new stretch of river, and the Third Army's vast dumps of bridging equipment were deep in the 6th Army Group zone. Starting in January, however, General Patton began moving his bridging equipment to Esch, in the southern edge of Luxembourg, in anticipation of a crossing farther north.

Final Plans and Directives

A SHAEF appreciation, late in January, concluded that the terrain north of the Ruhr was the most favorable for mobile operations, afforded the shortest route to cut off the Ruhr and reach the center of Germany, and probably would be the most strongly defended. Crossings of the Rhine, north of the Ruhr, could be made on a 20-division front, but, initially, only 35 divisions could be supported beyond the Rhine in this sector. The terrain on the Frankfurt-Kassel axis would be more difficult for mobile operations, and would require a greater advance. The Frankfurt industrial area, however, was second in importance to the Ruhr, and Kassel, once reached, was so situated that attacks could be directed to the northeast, east, or southeast. The crossing sites in the Frankfurt area were sufficient only for a 5-division assault, but, once across, 50 divisions could be supported.

Based on the foregoing, it was planned to:

1. Close to the Rhine, north of the Moselle.
2. Eliminate other forces west of the Rhine which constituted an obstacle or threat to subsequent Rhine crossings.
3. Seize bridgeheads north and immediately south of the Ruhr.
4. Deploy 35 divisions east of the Rhine, north of the Ruhr.
5. Deploy east of the Rhine, on the Frankfurt-Kassel axis, such forces as were available to draw the enemy away from the effort north of the Ruhr.

Though last in priority, this was SHAEF's first formal recognition of a crossing in the Frankfurt area, and an advance on Kassel.

A SHAEF directive of 31 January 1945 (SCAF #194) put into execution, with some modification, the first two steps of this plan. The 21st Army Group, with the United States Ninth Army under operational control, was directed to close to the Rhine, north of Dusseldorf, with two converging thrusts to be known by the code names of *Veritable* and *Grenade*. Except for operations to secure the Roer River dams and support Operation *Grenade*, the 12th Army Group was to assume the "aggressive defense," and the 6th Army Group was to maintain the defensive except for action to reduce the Colmar Pocket.

Phases of the Operation

On 20 February, in a letter to General Bradley, General Eisenhower outlined his plan for the development of operations through the next few months in three phases as follows:

Phase I

a. Advance to the Rhine in the north by the 21st Army Group (Operations *Veritable* and *Grenade*).

b. Aggressive defense by the 12th Army Group in the Ardennes to contain German divisions and widen gaps in the Siegfried Line.

c. Remain on the defensive south of the Moselle.

Phase II

a. Preparation for and crossing of the Rhine and the seizure of the initial bridgehead by the 21st Army Group. (The code name assigned this operation was *Plunder.*)

b. Drive the Germans back to the Rhine in the area north of the Moselle to ensure the security of the lines of communications to the north.

c. Remain on the defensive south of the

Moselle until the completion of *b* above, then initiate operations to take the Saar.

Phase III

a. Extension of the initial bridgehead in the north to build up a force for a further advance.

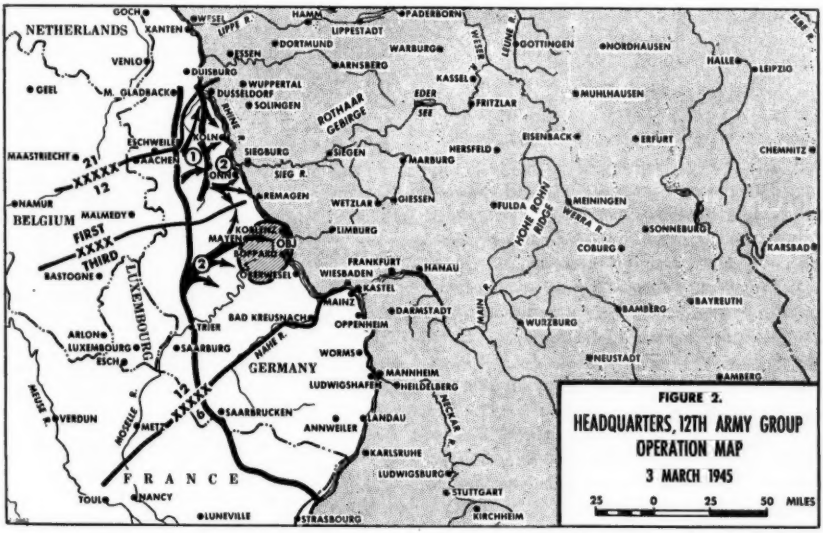
b. Remain on the defensive on the Rhine, from the Ruhr to the Moselle.

c. Complete the capture of the Saar and advance to the Rhine.

Note that no consideration is given in this plan to crossings in the Frankfurt area, or an advance along the Frankfurt-Kassel axis.

This letter also called for General Bradley's plan for the operations north of the Moselle. The plan was submitted on 23 February, and, on 3 March, SHAEF directed the execution of Phases I and II of the plan under the code name of *Lumberjack*. That same day, the 12th Army Group *Letter of Instructions Number Sixteen*, a directive for the execution of the entire plan, was issued. (See Figure 2.)

These operations, to conform to the phases of the basic plans, were divided into three stages, the first of which was to complete the current operations by the First Army in support of *Grenade*. The second stage called for the First Army to invest Köln and, on 12th Army Group order, to launch a strong attack on a narrow front southward to converge with the attack of the Third Army which was to advance eastward from the Kyll River to seize the Mayen-Koblenz area. The third stage was to complete the closure to the Rhine, and the clearing of the enemy from the west bank. In addition to assigning the Mayen-Koblenz area as the stage two objective of the Third Army, this directive ordered General Patton to secure a bridgehead across the Moselle to the southeast. Because the SHAEF plan had not specified operations southward across the Moselle, the 12th Army Group G3 was reluctant to include them in the operations plan, but finally consented on condition that the



directive be qualified by the phrase "if the enemy defenses are weak." Knowing General Patton, we did not believe that this added phrase would be much of a deterrent. This letter of instructions is significant, because the action brought about by its execution caused fundamental changes in the SHAEF plans.

Crossing the Rhine

Events moved swiftly and, on 5 March, stage two of Operation *Lumberjack* was ordered. At the same time, orders were issued to all troops to exert every effort to seize intact the bridges reported remaining across the Rhine. The German forces had begun to crumble, and it was hoped that by some miracle a bridge might be captured in the confusion of the enemy retreat. At 1640, on 7 March, the miracle did happen, as elements of the 9th Armored Division seized and crossed the Ludendorf Railway Bridge at Remagen.

A SHAEF directive (SCAF #224,), prepared before this portentous event, but not dispatched until early 8 March by underlings who had not yet heard the news, directed the following action:

1. 21st Army Group would execute Operation *Plunder* (crossing the Rhine north of the Ruhr) with a target date of 24 March.

2. 12th Army Group would continue Operation *Lumberjack.*

3. 6th Army Group, at completion of *Lumberjack,* would initiate an offensive operation in the Saar, under the code name of *Undertone,* with the objectives of:

a. Containing all possible enemy troops away from the main effort in the north.

b. Defeating the enemy west of the Rhine.

c. Closing to the Rhine from the Moselle southward.

d. Establishing bridgeheads over the Rhine in the Mainz-Mannheim sector.

4. 12th Army Group was to assist the 6th Army Group in Operation *Undertone,* by striking southeast across the Moselle in the rear of the enemy on the left flank of the 6th Army Group.

This, at least, put a SHAEF blessing on our proposed exploitation across the lower Moselle, but it definitely left the 12th Army Group out of any crossing of the Rhine.

A New Directive

General Eisenhower was jubilant over the news of the Remagen crossing, but his G3 representative arrived at our tactical headquarters, in Namur, the night of 8 March, a picture of gloom amid our rejoicing. I had been asked to bring our 12 December plan for the Rhine crossings and subsequent operations (Figure 1) to General Bradley's office and explain them to the visitor, since they were admirably suited to the exploitation of the Remagen bridgehead. His only reaction was to shake his head and bemoan the effect that this would have on his plans. Nevertheless, SHAEF changed their plans, and, "Owing to the rapid success of *Lumberjack* and the capture of a footing east of the Rhine," issued a new directive on 13 March (SCAF #232). The 12th Army Group was ordered to:

1. Secure firmly the Remagen bridgehead and launch a thrust therefrom toward Frankfurt.

2. Continue to assist Operation *Undertone.*

3. Prepare to employ the First Army, with not less than 10 divisions, in the exploitation of the bridgehead north of the Ruhr, with a target date of 15 April.

The Ninth Air Force was ordered to cooperate with the 12th Army Group, without prejudicing the support accorded other higher priority operations, namely *Plunder* and *Undertone.*

The 12th Army Group *Letter of Instructions Number Seventeen,* issued the same day (13 March), put into execution steps 1 and 2 of the new SHAEF plan.

The First Army was directed to secure a firm bridgehead line at Remagen.

The Third Army was directed to strike the enemy on the flank and rear, from the Trier bridgehead and southeast across the lower Moselle, to protect the left flank of the Seventh Army which had the main effort in the 6th Army Group's Operation *Undertone*. The Third Army was authorized to deal directly with the Seventh Army regarding the "form, method, location, and timing of this attack."

Third Army's Attack

The Third Army's attack from the Trier bridgehead jumped off early 13 March, and, at 0200, 14 March, General Patton crossed the Moselle south of Koblenz. Here, tactical surprise was achieved as armored columns struck swiftly across the rugged Hunsruck Mountains, reaching the Nahe River, at Bad Kreusnach, by the time the 6th Army Group's attack jumped off on 16 March. When the 6th Army Group broke through the Siegfried Line, on 20 March, the Third Army's two attacks had merged and cut deep behind the enemy lines, reaching as far as Annweiler and Landau. This placed General Patton opposite that reach of the Rhine for which he had prepared plans for crossing nearly 6 months before. Temporary boundary readjustments were made to assign to the Third Army that portion of the river from Mannheim to Koblenz.

While the Third Army closed to the Rhine, the 12th Army Group requested SHAEF, on 20 March, for permission to cross the Rhine at Worms on an *ad hoc* basis. The request also was made for Airborne Operation *Choker 2*, which had been planned to support a crossing in this area. A 6th Army Group message to SHAEF, dated 21 March, confirmed the 12th Army Group's request for an *ad hoc* crossing at Worms, but denied a requirement for Airborne Operation *Choker 2*. They also stated that they would relieve the Third Army at the bridges over the Rhine. These two messages brought forth a directive from SHAEF (SCAF #240), dated 21 March, to the effect that the 12th Army Group would establish a firm bridgehead across the Rhine in the Frankfurt area from which an advance, in strength, could be made in the direction of Kassel. The 6th Army Group was to take over the Rhine crossings south of the Main. The Allied Airborne Army, in conjunction with the 6th Army Group, would retain responsibility for Airborne Operation *Choker 2*. Thus, a second change in SHAEF plans, within 2 weeks, was brought about by 12th Army Group action.

Meanwhile, General Patton had been moving his bridging equipment forward from the dumps at Esch. Seasoned divisions, veterans of the Seine, Meuse, and Moselle river crossings, were poised on the banks of the Rhine. Then, a 2-day blackout on Third Army information along the Rhine was lifted, early 22 March, when a group gathered in our war room to hear the Third Army Liaison Officer make the following announcement, "Without airborne support, without days of heavy artillery preparations, and, finally, without even the benefit of an operational code name, the Third Army crossed the Rhine at 0200 hours this morning." General Patton had achieved the first assault crossing of the German Rhine in modern times. This crossing, at Oppenheim, progressed smoothly and was soon firmly established. The objective of Airborne Operation *Choker 2* was overrun before the troops could be alerted at their bases.

On 25 March, the Third Army made two more crossings of the Rhine, at Oberwesel and Boppard. To the north, the First Army had been expanding the Remagen bridgehead until, on 25 March, it extended from Koblenz to Bonn. North of the Ruhr, Operation *Plunder* was executed on schedule the night of 23-24 March and, by 25 March, the 21st Army Group, with United States Ninth Army and United States XVIII Airborne Corps under operational control, had a firmly established footing on

the east bank of the Rhine. The 12th Army Group was across the Rhine in strength equal to that of the 21st Army Group, and we had a greater number of bridges to support our crossing.

In a final change of their basic plan, SHAEF, on 24 March (SCAF #244), announced that because of the success in the south and the maximum deployment in the north, they would reinforce every success with utmost speed. This had the effect of removing the priority from the effort north of the Ruhr.

The Ruhr Pocket

A SHAEF dispatch of 25 March (SCAF #247) directed that the northern group of armies from the north, and the central group of armies from the south, advance to effect a junction in the Kassel-Paderborn area, mop up the area east of the Rhine, and prepare for further advances. The advance beyond the Rhine posed two problems. With railheads west of the river, the necessity for trucking supplies across the tactical bridges and up to the troops operating to the east of the Rhine would limit the depth of the advance, and the number of troops employed. For the first time, we would be operating deep in German territory and would have to divert considerable troops for the protection of the rear areas. Of the 57 American divisions then available, the Ninth Army had 12 under 21st Army Group control. SHAEF had earmarked seven for their reserve, and one was containing the Brittany fortresses. This left 37 for employment south of the Ruhr, and 4 of these were needed for rear area occupational duties. There remained, then, 33 divisions for the offensive across the Rhine. The logistical planners estimated they could support such a force to a depth of 25 to 30 miles beyond the river, and a further advance of not more than 16 of these divisions to the Kassel area, provided only light resistance was encountered. This, then, called for an advance on a comparatively narrow front with the flanks resting on strong natural obstacles.

It was decided to consolidate the bridgehead south of the Ruhr, then advance from the bridgehead to the Kassel-Paderborn area. (See Figure 3.) The Seventh Army of the 6th Army Group, with six infantry and two armored divisions, would expand the bridgehead between the Main and Neckar Rivers, and protect the 12th Army Group right. The 12th Army Group with the Third and First Armies of eight infantry and three armored divisions each, and a reserve of one armored and two infantry divisions, would seize the bridgehead line, Hanau—Giessen—Siegen—Sieg River to its junction with the Rhine, from where an advance in strength could be made in the direction of Kassel. This directive was issued on 25 March.

By 27 March, the Third Army, which was still using its Rhine bridges south of the Main, had two armored divisions across the Main River—the 4th at Hanau and the 6th at Frankfurt—while the First Army had reached the line Wetzlar—Siegen with the 7th and 3d Armored Divisions. On 28 March, General Bradley ordered the completion of clearing the enemy from the Rhine bridgehead area and directed the continued advance. The Third Army was ordered to advance to the Hersfeld-Kassel area, and drive the enemy east of the line Hohe Rohn Ridge—Werra River—Wesser River. The First Army objective was the Warburg-Paderborn area. They also were directed to protect the left flank, to make junction with the 21st Army Group, and, in co-operation with it, clear the enemy from the pocket between forces. Units held in reserve were released to the armies for occupation duties, provided they could be made available on 24-hour notice.

To the north, the 21st Army Group had directed the United States Ninth Army to protect the right flank of the British Second Army as it moved eastward, and to gain contact with elements of the United

States First Army in the vicinity of Paderborn. Field Marshal Montgomery added that if the advance of the First Army was held up, the Ninth Army would push on to the Elbe. General Eisenhower had informed General Bradley that the Ninth Army would revert to the control of the 12th Army Group when contact had been gained between the two beyond the Ruhr.

General Patton left his VIII Corps to clean up the bridgehead area, while he struck northeast with the XX and XII Corps abreast, up the Hessian Corridor on the right of the First Army. The Third Army's right, beyond the Seventh Army, Gebirge and advanced his First Army almost due north from the Giessen-Marburg area. The initial formation of three corps abreast was changed as the front narrowed, and the III Corps in the center was pinched out at the Eder See by the V Corps. General Collins, with the VII Corps on the inner flank, had started with six divisions (half the strength of the First Army) including the two along the Sieg River. Peeling off four infantry divisions and his corps reconnaissance regiment to protect his left flank as he advanced, he reached his objective with only the 3d Armored and the 104th Infantry Divisions

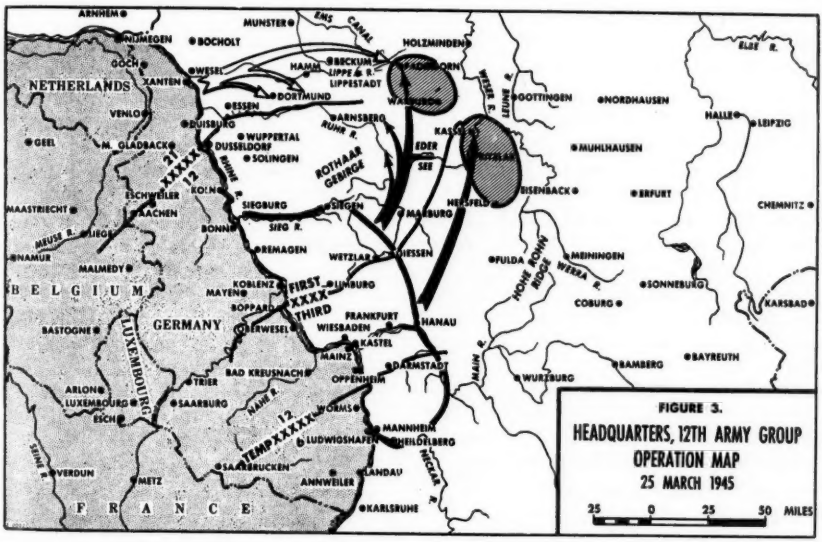


FIGURE 3.
HEADQUARTERS, 12TH ARMY GROUP
OPERATION MAP
25 MARCH 1945

was well protected by the Hohe Rohn Ridge line. With the 6th and 4th Armored Divisions leading their respective corps, General Patton reached his objective with a total of eight divisions, having left but one behind to cover his rear and flank beyond the bridgehead.

General Hodges, leaving two infantry divisions to protect his flank along the Sieg River, pivoted about the Rothaar which, teamed together, had spearheaded the advance all the way from the Rhine. The 3d Armored Division advanced a record 90 miles, on 29 March, and it was in the dusk of the following evening that its gallant commander, Maurice Rose, was captured and shot to death by a trigger-happy German tank sergeant, a few miles south of Paderborn, the German Tank Center.

General Simpson's plan, which had been co-ordinated with Generals Bradley and Hodges, called for passing the XIX Corps, with two armored and two infantry divisions, through the bridgehead of the XVI Corps and across the Lippe River to seize Hamm, and continue to the east. The XIX Corps was ordered to protect the army right flank beyond the Dortmund-Ems Canal, and establish and maintain contact with elements of the 12th Army Group in the vicinity of Paderborn. The Ninth Army's other corps, the XIII, initially with one armored and one infantry division, crossed the Rhine at Wessel, and advanced to protect the south flank of the British Second Army, assuming command of the United States 17th Airborne Division which had been operating with the British since its drop.

The going, north of the Ruhr, was much slower than on the south because of the innumerable water obstacles that had to be negotiated. Nevertheless, the 2d Armored Division, leading the XIX Corps, advanced 70 miles in 3 days of round-the-clock action. Because the fanatical defense of Paderborn was delaying its capture, General Hodges and General Simpson agreed to shift their point of contact westward to the town of Lippstadt. Late the night of 31 March, the 2d Armored Division directed General Hinds, Commanding General, Combat Command B, who was negotiating the surrender of the town of Beckum, to move his force to the southeast to contact the 3d Armored Division in the vicinity of Lippstadt. General Hinds advanced in two columns, with his right column directed on Lippstadt. This column, however, became heavily engaged west of Lipperode, and it was the left column, under Colonel Paul Disney, which shifted over behind the other column and pushed on. Colonel Disney's force consisted of an armored regimental headquarters, a tank battalion, an armored infantry company, an armored artillery battalion, a platoon of armored engineers, and a tank destroyer platoon.

The Ruhr Encircled

At 0300, on 1 April, General Collins ordered the 3d Armored Division to send a force to Lippstadt to make junction with elements of the 2d Armored Division. Task Force Kane of Combat Command Doan was diverted from the assault of Paderborn for this mission. This task force comprised a tank battalion, an infantry battalion, an armored field artillery battalion, a platoon of armored engineers, and a tank destroyer platoon. First contact was gained between the light aircraft of the two columns, who identified the leading ground elements of both divisions. Task Force Kane of the 3d Armored Division and Colonel Disney's column of the 2d Armored Division met in Lippstadt, at 1530, 1 April, completing the encirclement of the Ruhr and the entrapment of the German Army Group B with a strength of approximately 325,000.

Since its break-out from the Remagen bridgehead, on 27 March, the 3d Armored Division had advanced 180 miles, while the 2d Armored Division, after attacking from the bridgehead north of the Ruhr on the night of 29 March, advanced more than 70 miles to make this juncture. It is particularly significant that these two armored divisions, the 2d and 3d, were used for this task. They were known as "heavy" divisions, because they were the only two United States armored divisions which had not been reorganized in the fall of 1943. They possessed more than twice the tank strength of the "light" division, and, in addition, they had a greater proportion of service and support troops. This gave them the sustained power to complete this operation in so short a time.

At midnight 3-4 April, the Ninth Army reverted to the control of the 12th Army Group, which immediately directed the reduction of the Ruhr pocket by the Ninth

and First Armies, and an advance to the east by the First, Third, and Ninth Armies. To exploit the disorganized state of the enemy, the advance to the east was never halted, and as troops were pinched out by the compression of the pocket they were moved to join the advance. The First Army was assigned the XVIII Airborne Corps Headquarters for the reduction of the Ruhr pocket only. General Hodges assigned them five divisions (four infantry and one armored), and the sector between the Rhine, the Ruhr, and the Leune Rivers. The III Corps, with three divisions (two infantry and one armored), had the rest of the pocket, from the Leune to the army boundary along the Ruhr River. The First Army continued eastward with the V and VII Corps and a total of four infantry and two armored divisions. General Simpson left to his XVI Corps, with one airborne and three infantry divisions, the mean job of clearing most of the bombed out industrial area north of the Ruhr River. The XIX Corps was allotted the clearing of the eastern tip of this area, for which task they left one infantry and one armored division, and continued their drive to the east together with the XIII Corps. After more than 2 weeks of hard fighting, the Ruhr pocket collapsed, on 18 April, and yielded 325,000 prisoners. By that time, this greatest encirclement of history was all but forgotten, for we held a bridgehead across the Elbe, had reached the Czechoslovakian border, and had crossed the Danube in our drive to contact the Russians and end the war.

Thus, the Ruhr fell on D plus 316, just 14 days before the date SHAEF had planned for its capture a year earlier. However, the operations which led to the seizure of the Ruhr were vastly different from those conceived in this same plan.

The forces of the United Nations are in Korea to put down an aggression that threatens not only the whole fabric of the United Nations, but all human hopes of peace and justice. If the United Nations yields to the forces of aggression, no nations will be safe or secure. If aggression is successful in Korea, we can expect it to spread through Asia and Europe to this hemisphere. We are fighting in Korea for our own national security and survival.

President Harry S. Truman

Economic Potential For War

An Element in Military Planning

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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THE potential ability of a nation to support a war effort logistically is encompassed in the term "Economic Potential for War." This term may be defined as that portion of the total production of goods and services which can be devoted to war. In time of emergency, a national economy can step up its production. The total it can produce is its economic potential. Within this total is the portion that can be used for war, that is, the economic potential for war. The portion devoted for war purposes comes from increased production and a reduction in the share taken by the civilian economy.

It is the economic potential for war with which the military planner is particularly concerned. The problem of assessing this potential has been attacked in a number of ways. Most of the methods involve consideration of material resources, manpower, productive capacity, the services, and various means of economic measurement. The method discussed herein does not provide mathematically correct measurements, but rather is designed to develop a basic understanding from which usable conclusions can be drawn.

In assessing the economic potential for war of a nation, it is necessary to examine the elements which make up economic strength. A study is made of the geographic features which affect economic progress, of the raw materials upon which the economy rests, of the people, and of the industrial facilities available to turn the raw materials into useful items. Added to these is the factor of foreign trade, by which the nation can overcome shortages in raw materials and build additional markets for its industry.

Economic stature is, however, not a simple matter of adding statistics. It is conditioned by many immeasurable considerations. Government, for example, plays a leading role in economic life, and no study such as this can be complete which neglects political influences. Again, the population of a nation is no stronger than the individuals who compose it. It follows that morale, patriotism, tradition, and other psychological factors which affect the individual must be weighed. Then, too, since the study is concerned with wartime economic potential, certain military items cannot be ignored. Is there a large peacetime military force, with a resulting drain on the economy? What of the stock piles which are built up in time of peace, and which will directly affect the economy in time of war? It is only when the effects of these factors

are added to the economic elements that a true picture of the economic potential for war of a nation can be gained.

Among the elements which are deemed necessary in assessing the economic potential for war of a nation are those shown in Figure 1.

Although not listed, the element of time is present through the entire study. A nation may have been powerful in the past, but has since lost strength and may be growing weaker. In another instance, the reverse may be the situation, where the nation is growing progressively stronger. Thus, it is well to ask the question: "Is time working for or against the economic potential for war of the nation?" Another and equally significant time factor concerns the length of time the nation will require to mobilize its full economic strength for war purposes. In a situation in which the issue may be determined in a matter of months, years cannot be spent in building a war economy. A nation cannot be potentially strong for war if the time required for the development of its economic potential will not be available.

ELEMENTS OF ECONOMIC POTENTIAL FOR WAR

Economic Elements

1. *Physical Geography:*
   - *a.* Climate and position.
   - *b.* Size, shape, and topography.
2. *Natural Resources:*
   - *a.* Energy resources.
   - *b.* Mineral resources.
   - *c.* Agriculture and related resources.
3. *Population:*
   - *a.* Size.
   - *b.* Health.
   - *c.* Education.
   - *d.* Distribution by occupation.
   - *e.* Standard of living.
4. *Industrial Capacity:*
   - *a.* Agriculture.
   - *b.* Mining and manufacturing.
   - *c.* Services.
5. *Foreign economic relations.*

FIGURE 1.

Economic Elements

Most of these elements are obvious as indicators of economic strength, although some may seem less directly connected to the study of the economic side of war. Physical geography always has been a subject for intensive study by the soldier. In an economic potential study, geography is examined, not to see how it affects the maneuvering of armies, but rather to determine how it conditions the economy of the country. Climate affects the health and energy of people and is an important factor in the quantity of food that can be produced. The geographic position of a nation has much to do with its sources of supply, and its ability to trade with other nations. The amount of arable land places a limitation upon the population that can be supported; shape affects physical and political unity; and mountains, deserts, rivers, and harbors condition the economic structure.

The military planner must familiarize himself with pertinent economic principles which will enable him to evaluate a nation's economic potential for war, just as he must acquire facility in purely military matters

Rich natural resources go a long way to make a nation powerful. On the other hand, deficiencies in vital resources, such as fuels, act as brakes on the economy. Among the energy resources, coal, petroleum, and water power are the most im-

portant, although others such as natural gas, wood, peat, draft animals, and even human physical effort cannot be ignored. But under present economic conditions, the possession of or ability to obtain coal and petroleum are necessary for industrial greatness.

Economic strength today is based largely on the metallic and nonmetallic riches that lie beneath the earth's surface. Of the minerals, iron ore is of overwhelming importance, for, together with coal, it forms the foundation upon which heavy industry is built. No great power can survive without access to large supplies of coal and iron, nor can modern wars be fought without these minerals as a base. The ferroalloying metals, and the many nonferrous metals, make possible the variety and physical characteristics called for by modern technology.

The population element concerns itself with more than size. Large numbers are required as a basis for strength, but numbers alone are not sufficient. The population must be considered by age and sex groups. Trends in birth and death rates have their story to tell. Health, education, scientific and technological training, the versatility of the labor force, the standard of living, and occupational distribution, all reveal strengths and weaknesses in a nation's economy.

The elements classified under the heading "Industrial Capacity" are not only of great significance in computing national economic power, but also lend themselves to relatively accurate and comparable measurement. Industry includes agriculture, mining and manufacturing, and the service industries.

The main factor to be considered in agriculture is the ability of a nation to feed itself. While excessive concentration of a nation's economy upon agriculture is undesirable, it is equally true that agricultural deficiencies work a real hardship on a nation in its efforts to support a war effort. In addition to food, the nation must have access to other products of this primary industry in order to have a rounded economy, for example, lumber, vegetable and animal oils, fibers, and rubber.

Since the armed forces are dependent upon the mining and manufacturing industries to supply them with material necessities, the importance of this element hardly can be overstated.

Steel production is an excellent guide to the relative industrial capacities of the major nations of the world. Steel is a material essential to many manufacturing processes, and is used extensively in equipping industrial facilities as well as for war materials. The creation of a balanced economy without large quantities of steel is impossible.

The service industries are of extensive range and include the professions, transportation, communications, financial institutions, utilities, and a great number of the activities which make the modern industrial state possible. Under the pressure of national emergency, it is possible to reduce the amount and number of services supplied, and the people, thereby released, comprise a valuable asset to a nation in terms of its manpower potential for war.

In spite of the desire to be self-sufficient for military reasons, no nation can attain this goal completely, and its foreign economic relations play an important part. Natural resources are distributed unevenly and all nations are, to some degree, dependent upon imports. As its industrialization increases, a nation tends to become more acutely dependent, not only on imports of critical raw materials to feed its industries, but frequently on imports to feed its population. As the standard of living rises, tastes change and imported commodities, formerly considered luxuries, tend to become necessities.

A nation's economic potential is affected critically by the conflict between policies designed for the attainment of military

self-sufficiency and those which favor the expansion of foreign trade.

Contributory Elements

Contributory elements are those which, though not economic in character, have a positive influence on the economic growth and strength of a nation. (See Figure 2.) Although these elements have been placed in three categories—political, psychological, and military—it must be recognized that there is not always such a clear-cut distinction, nor are these the only noneconomic influences with which one must reckon.

The political organization of a nation always has had an influence on its economic structure, and this influence appears to grow greater as time goes on. Even in nations in which individual enterprise is the underlying economic principle, the hand of government is felt to a considerable degree. The influence of the form of government on economic life varies between nations. What is of significance here is the ability of the government to manage its economic affairs in time of war.

Adequacy of government is the significant point. Is the government adequate to take the managerial steps necessary in order that the economy of the nation shall reach its full efficiency? Or is the government too weak to impose and enforce the controls that are necessary, with the result that the economy loses its balance? Or does the government overcontrol? The degree of control varies between nations, and what may be best for one may be too much or too little for another. Adequacy of government is a point which can only be determined for each nation individually.

Political ties between nations strengthen or weaken a government and have an influence on the economic life of a nation. It is not unusual for political and trade treaties to go hand in hand. In assessing the economic potential of a country, it is, therefore, necessary to take the international political relationships of the nation into account.

Psychological elements are those intangible influences which affect the individual. Among these are morale, patriotism, and the willingness of the people to

ELEMENTS OF ECONOMIC POTENTIAL FOR WAR

Contributory Elements

1. *Political:*
   - *a.* Form of government.
   - *b.* Adequacy of government.
   - *c.* Political relationship with other nations.
2. *Psychological:*
   - *a.* Morale.
   - *b.* Incentives.
   - *c.* National traditions and customs.
3. *Military:*
   - *a.* Forces-in-being.
   - *b.* War reserves.

FIGURE 2.

give their best to their jobs, both in peace and in war. There are the incentives held out to the individual—security and an adequate standard of living for himself and his family, the chance of advancement, and an opportunity to educate his children—the things that the normal person wants for himself and his family. National traditions and customs play their parts. Does the nation have a tradition of progress and success, or traditionally does it produce only mediocre results? These things are not susceptible to absolute measurement, but their influence is unmistakable.

The third category of contributory elements is that labeled "Military," and is composed of the forces-in-being and the reserves on hand to use in case of war. A large standing military force leaves not only fewer workers for the labor force, but its supply and equipment affects the output of the industrial machine of the nation. Reserves for war represent a drain upon the industrial output, but if

they are large it follows that the nation can mount a war effort more quickly. War reserves are, in a sense, a stock-piling of time.

Analysis

From the foregoing scrutiny of the economic structure of a nation, an insight is gained into the economic potential of that nation. But the ability of the nation to support a war effort logistically goes beyond this. The information gained of the economic structure of the nation can, through analysis, afford conclusions as to the effectiveness of the economy in time of war. There are a number of considerations which will assist the analysis and which will make the conclusions realistic.

Trends and the Use of Statistical Data

The extent of the economy of a nation at any one time is important, but its character is of greater significance. Is the economy dynamic, or is it static, or, as may be the case, is it retrogressive? A study of trends will give a hint as to the future economic activity of the nation.

Statistics of the population distribution by occupation indicate the number of people in each of the various industries. The more advanced a nation's economy becomes, the larger will be the number of people found in the service industries, with fewer in the primary industries. Such data permit direct statistical comparison between nations. For example, the fact that one nation employs more than three-fourths of its working population in agriculture, while another utilizes only about one-eighth for this purpose, would be a useful item in comparing the economic potential for war of the two nations. A comparison, at the same time, of the employment of the nonagriculture labor force will give a still more comprehensive picture of the difference between the two economies.

In order to see a national economy as a whole, it is helpful to translate its operations into monetary terms, since money is a convenient and common unit of measure. This involves putting together all of the factors which produce the basic needs of food, clothing, and shelter, as well as all the convenience and the services which provide the amenities of life and establish the standard of living. *Gross National Product* is a means for measuring this national output and making the comparisons which are desired. *Gross National Product* is the adjusted market value of all goods and services produced in an economy during a given period, usually a calendar year.

Since production is impossible without the expenditure of energy, the total energy consumption of a nation is indicative of its total production. Indexes derived from energy consumption statistics are particularly valuable since they tend to accentuate manufacture. Energy production also is significant, since a discrepancy between consumption and production usually indicates whether a nation is a net importer or exporter of fuel. Energy figures are expressed in physical units, which permit the direct comparison of one nation with another.

Modern industry is dependent upon minerals, and statistics presenting the total mineral production of the country under study are significant. Statistics on mineral reserves are of assistance in forecasting future trends. It must be realized, however, that, in many cases, figures for reserves are unreliable, because vast areas have not yet been thoroughly explored, and new discoveries may change the reserve picture overnight. In other cases, mineral bodies are known to exist, but have never been measured.

Convertibility of the Economy

The analysis made to this point gives a detailed picture of the economy of the

nation under study, and permits conclusions to be drawn as to its future capabilities. From this point, the study is directly related to the nation's war supporting capabilities. First among the factors to be taken into consideration is the convertibility of the economy from a condition of peace to one of war. This factor relates directly to the time element discussed earlier. A peacetime economy which is incapable of rapid conversion to the production of war goods will not be as adaptable, in time of war, as an economy that can begin production of munitions without protracted delay. Again, the type of industry predominating in a nation has an important bearing in this respect. Some types of industry are convertible to the production of war goods with little delay, while other types require an almost complete change. Finally, the flexibility of management has much to do in the successful conversion of industry from commercial products to munitions.

Strategic Economic Strengths and Weaknesses

Damage by action of enemy military forces or by sabotage is another factor present in time of war which may alter greatly the war potential of the economy of a nation. Strategic bombing may play havoc with the economic elements upon which a nation depends for its war production. The concentration of industry in an area easily accessible to enemy action is a weakness which may be fatal. The dependence upon a single source of supply for a vital material may be satisfactory in time of peace, but may be a liability in war.

Civilian Demand

The effect of civilian demand upon the economic potential for war of a nation goes back to some of the elements already discussed. That the civilian population must receive a share of the production of goods and services in time of war is axiomatic. Unless the nonmilitary portion of the population receives something more than the bare minimum requirements, all production, including that for the direct war effort, will be reduced. The question is, "What is the level to which the civilian share may be reduced?" The standard of living of the population must be studied in order to gain an insight into this question. A people accustomed, in time of peace, to an existence supported by black bread will demand much less than a population which takes for granted the luxuries afforded by twentieth century progress. One nation may produce twice as much steel each year as another, but its people demand goods which use a much greater proportion of steel than the people of the second nation. As a result, the amount of steel available for a war effort is not two to one, as the bare figures would indicate, but something much less impressive than this. Morale and patriotism and the other psychological elements have a bearing on this factor of civilian demand.

Past Performance

One of the most enlightening factors in forecasting the ability of a nation to support a war effort logistically is its past performance in this respect. If, in the past, the nation has made such an effort, whether wholly successful or not, then its present and future ability can be measured against this past performance. Elements of economic strength which permitted a successful effort in the past may now be absent or may be dwindling to such an extent as to cause failure in the foreseeable future. During the past, the nation may have received help from allies which will not be forthcoming in the future. Again, lack of productive facilities which caused failure in the past may have been corrected, or technological improvements may have overcome outmoded industrial practices. Analysis of the economic trends will give a basis upon which predictions, in terms of past performance, may be made.

Comparison With Possible Enemy

To develop the true significance of a nation's economic potential for war, a comparison should be made with the potential of its actual or possible enemy. To carry this to its logical conclusion, the comparison should be between blocs of nations, since no leading nation today stands alone. To make such a study exhaustively would, of course, require that parallel studies of the economic potential for war of the two countries, or blocs of nations, be made, followed by an element by element comparison. Even then, a mathematical comparison could not be made, for the economic potential for war of a nation is affected by too many intangible elements which defy exact measurement.

For some purposes, a less exhaustive comparison may be sufficient. This may be made by taking certain of the elements which are susceptible to more or less accurate measurement, and a liberal amount of judgment. These data on the population distribution by occupation, *Gross National Product*, energy production and consumption, mineral production, and steel production will permit a statistical comparison between the two possible antagonists. These statistics must be tempered by certain intangible factors, such as the psychological elements and the strategic strengths and weaknesses of each side. Conclusions drawn from such a comparison should produce, at least, a reasonably realistic result. Such a study would not by itself, however, give a comprehensive picture of the economic potential for war of either country. Only by a thorough examination of all the elements, both economic and contributory, can such a picture be obtained.

Economic Potential for War and the Military Planner

The study of the economic potential for war is a technique by which the military planner can acquire the understanding of economic principles as applied to war. From it, he will receive a key to the relationships between the elements of economic strength and the noneconomic considerations. Such a key is essential to those responsible for the security of the nation.

Modern war is total war, far removed from the localized and limited conflicts of yesterday. Conflict between nations is no longer a matter only of armies, navies, and air forces. It is a struggle between nations and national economies as well as their armed forces. The field of cognizance of the military planner has extended far beyond the strategic, tactical, and logistic elements traditionally assigned to the military profession.

With the broad economic base of today's war, the military planner must familiarize himself with pertinent economic principles, just as he must acquire facility in purely military matters. Neither the capabilities of his own nation, nor of the enemy, can be determined without a complete knowledge of the economic potential for war of each nation. The planner can, of course, turn to the economist for economic data, but he alone can and must weave these facts into an over-all plan.

QUIBERON BAY

Colonel Seymour A. Potter, Jr., *Corps of Engineers*
Instructor, Command and General Staff College

THOSE who participated in or followed the progress of *Overlord* operations through northern France and Germany probably are as familiar with the names of the great Channel ports as they are with the inland towns and villages where critical combat action took place. Cherbourg, Le Havre, and Antwerp, for example, must be almost as well known as St. Lô, Aachen, or Bastogne.

There is one port, however, on which the public eye was not focused, yet which had a profound affect on the planning for Operation *Overlord*. Except for the unexpected tenacity of the enemy forces on the Brittany Peninsula, and the fortuitous seizure of Antwerp virtually undamaged, this port might well have supplanted Cherbourg or Le Havre as a major factor in the logistical support of the operation.

The port in question is Quiberon Bay. Although the plans for its military development were never consumated, its story is of current interest for two important reasons. First, it forms a concrete illustration of how the tactical plans in a major operation may be dictated by logistical considerations. Second, it illustrates a concept of port development involving a maximum dependence on existing natural facilities and a high degree of dispersion, both of which may be exceedingly important factors in future combat operations.

Quiberon Bay

Quiberon Bay lies on the south coast of the Brittany Peninsula, about midway between Brest and St. Nazaire (see Figure 1). The bay is formed by the narrow peninsula of Presquile de Quiberon and a series of small islands extending from the southward tip of the peninsula to Le Croisic on the west coast. Belle Isle, lying farther to the southwest, forms an additional barrier against the rough weather for which the Bay of Biscay is noted.

Within this protected "lee" lies Quiberon Bay, approximately 30 miles long and 10 miles wide. From its northern shore, reached through the narrow passage between Point Navalo and Point de Kerpenhir, is the Gulf of Morbihan, into which flows the Auray River.

Despite its natural advantages of sheltered waters and capacious anchorages—the area has never been developed into an active port. It figured in history as the assembly point for the French force which was to invade England in 1759, but with the defeat of the French fleet in Quiberon Bay by Admiral Hawke, the invasion attempt was abandoned.

Quiberon Bay is an example of how complete intelligence information, plus imagination and ingenuity, provided a simple solution to a complex logistical problem, involving a maximum reliance on natural facilities

After this brief moment of historic importance, Quiberon Bay again lapsed back into its traditional character as a pleasant and picturesque bit of the Brittany coast, noted chiefly for its favorable mention in tourist guide books.

Early Port Planning

Preliminary planning for Operation *Overlord* had emphasized the necessity for moving tremendous tonnages to the Continent. This planning had further highlighted the fact that the critical link in the chain of supply was the ability to land these tonnages at locations along the French coast, from which they could be moved inland expeditiously to the fighting forces.

The problem was complicated by the generally difficult conditions of tide and weather which exist along the English Channel and the Bay of Biscay. The tidal range, in some locations, is as great as 40 feet, and the weather, even in the summer months, is an unpredictable factor. These conditions had required the construction, over a period of many years, of massive breakwaters, long piers of great height, and extensive systems of "locked" basins in which ships could lie during recurrent periods of low water.

It was apparent, therefore, that maximum advantage must be taken of the existing ports to avoid the almost impossible task of constructing similar or substitute facilities. It was equally apparent, however, that the complicated nature of the existing facilities made them a particularly remunerative target for enemy demolitions. Several hundred pounds of explosives, for example, intelligently used in the heavy gates controlling a "locked" basin could require several thousand man-days of labor to repair them before the basin would become suitable for use. One or two ships, sunk in the entrance channel to a port, might necessitate several weeks of work by divers and salvage crews before

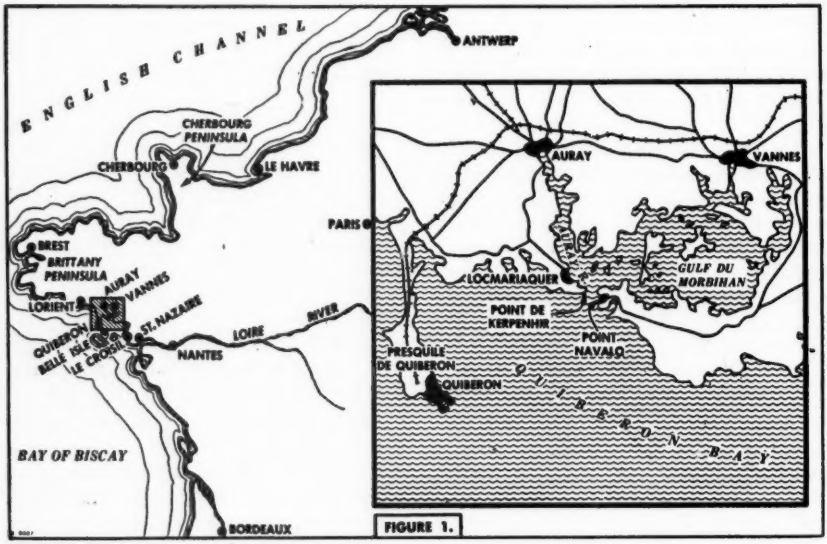


FIGURE 1.

the hulk could be cut apart or "flattened" by explosives, so that vessels again could negotiate the channel.

These considerations led to the conclusions that not only must the tactical plans provide for early seizure of all major ports but, in addition, some "ace-in-the-hole" must be included as insurance against the probability that extensive repairs would be required before the ports could be used effectively.

To meet the first requirement—early capture of existing ports—the tactical and logistical plans were integrated, as illustrated in Figure 2, to provide for:

1. The initial landings on favorable beaches at the base of the Cherbourg Peninsula.
2. A thrust west to seal off the peninsula, then north to seize Cherbourg.
3. A drive south to cut off the Brittany Peninsula and free St. Nazaire.
4. A westward thrust to clear the Brittany Peninsula and seize Brest, as well as the many smaller ports along the coast.
5. An expansion southward to open the important Loire River port of Nantes.

Only after the completion of these steps was it felt that the Allied armies would be in a position to direct their attention eastward to the primary purpose of defeating the enemy in his homeland.

The second requirement—some means of meeting the probability of extensive damage in existing ports—resolved itself into a technical rather than a tactical problem. The initial solution was the now famed *Mulberries "A"* and *"B,"* designed as artificial ports to be towed to the landing beaches, so as to provide the sheltered water and unloading facilities which would be essential until port repairs were effected.

A New Port Is Needed

At about this time, however, disturbing reports on the condition of the French ports began to arrive with increasing frequency. Allied bombings of the submarine pens at St. Nazaire had virtually destroyed the entire port. Dredging in the Loire River had ceased, and the channel was silting rapidly. Ships, filled with concrete, were being sunk in the approaches to all ports not actively used by the enemy. A systematic program of destroying all harbor craft and cargo handling equipment had been instituted. New types of underwater mines, exceedingly difficult to detect and remove, were being placed extensively in all harbors.

As a result of this information, the capacity estimates of all ports had to be reduced drastically, and the port problem, though once solved satisfactorily, was reopened with a vengeance. The possibility of increasing the capacity of the *mulberries* was considered, but, because of construction difficulties and the probability that they could not be operated through the winter storms of the English Channel, this idea was abandoned.

It was obvious, then, that a new port of *some* kind had to be provided, and that, in its design and construction, *simplicity* must be the overriding consideration since the demands of the *mulberries* had already taxed available heavy construction facilities almost to their limit.

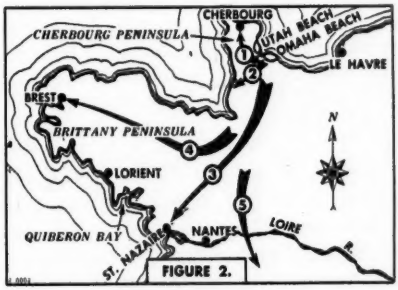


FIGURE 2.

Selecting the Site

To find a suitable location, the French coast line from Le Havre to Bordeaux was

studied exhaustively. Information was obtained from Admiralty charts, mariners' handbooks, maps, and photographs. In the case of locations which looked promising, Great Britain was combed for personnel, civilian or military, who were familiar with the area and who could shed some light on its possibilities. The collection of this technical intelligence proceeded all too slowly. Information from United States sources was practically nil. The British intelligence plan had been predicated generally on the assumption that France would remain available as a base for Allied operations, and so the coverage of French facilities was strictly limited. Work was continued, however, and the choice gradually was narrowed down to three or four possible locations.

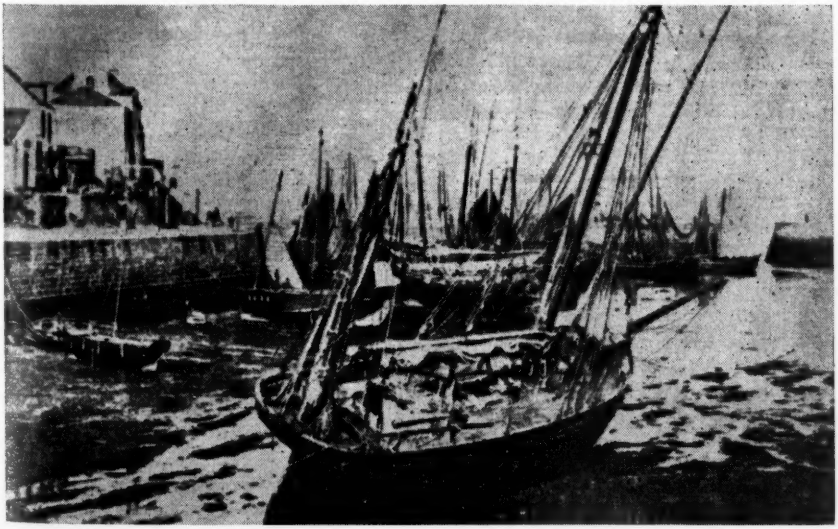
It was essential that the site, finally selected, meet certain important criteria. First, its early capture had to be possible within the framework of the tactical plan. Second, sheltered water was essential—some *natural* protection against the violence of the weather—to avoid the prohibitive task of constructing artificial breakwaters similar to those designed for the *mulberries*. Third, anchorage area for deep-draft vessels was required, together with unloading facilities which could be developed to handle 10,000 tons each day. Last, and certainly not least, the means to move large tonnages inland from the port had to be actually or potentially available.

Throughout the investigation, Quiberon Bay had looked particularly attractive. It provided capacious anchorages of adequate depth, and the inland transportation net was capable of development to meet anticipated needs. However, during the winter months, weather conditions would prevent the use of lighters to unload ships anchored in the bay. The alternative of providing deepwater berths appeared impracticable since the gently sloping nature of the bottom near the shore would require the construction of extremely long piers.

During the study of this area, however, one curious fact had been developed. The Auray River, flowing into Quiberon Bay from the north, had scoured a narrow channel almost 80 feet deep near the small fishing village of Locmariaquer (see Figure 1). Unlike the gradual slope of the bottom in Quiberon Bay, this channel had been cut deeply into hard, impervious strata, and its sides, beneath the water surface, were steep and shelving. Except at periods of low water, entrance into the channel could be gained by the deepest draft vessels using a circuitous passage leading between Point Navalo and Point de Kerpenhir. The river had, in effect, cut a deepwater pool, approximately 15,000 feet long and from 100 to 1,000 feet wide behind the protection of a natural breakwater. Through a geological "accident," the unusually steep sloping sides of this channel had placed the deep water within an easy 300 to 500 yards of the shore!

At this point, a plan began to take form. Here was deep and sheltered water—a safe place for large ships to lie alongside piers or landing stages and discharge their cargo—together with anchorage areas from which lighterage operations could be conducted safely. True, the pool was narrow; Liberty ships could not be permitted to swing at anchor, and mooring would be required. The entrance into this protected deep water was tortuous, and expert pilotage would be essential. The problem of designing and constructing floating piers or landing stages to absorb the 15-foot tidal range yet had to be solved. The method by which the gap between these piers and the shore might be bridged was still a matter of conjecture. Nevertheless, here, potentially, was the answer to the requirement for a new major port. The details would be troublesome, of course, yet nature had provided the basic facility—sheltered

The tidal range, in some locations along the Bay of Biscay and the English Channel, is as great as 40 feet, which provided a difficult problem for the logistics planner to solve. The range at Quiberon Bay was only 15 feet. The effects of the tide are illustrated in these photographs. Above, Quiberon Bay at high tide; below, the same location at low tide.



water—and men could work out the means to utilize it.

Designing the Port

No useful purpose would be served in recounting the purely technical problems which were met and solved in designing the port. The solution reached is of interest, primarily, from the fact that it emphasized simplicity, and that it utilized materials which could be provided without adverse affect on the other construction projects required for the support of the operation.

The plan, as finally developed, is shown in Figure 3. Its inherent simplicity is apparent. Within the deepwater pool, moorings were to be placed for 30 deep-draft vessels. A landing stage, designed to float up and down with the tide, provided berths for five Liberty ships.

Causeways of fixed, rather than floating construction, led from the shore line almost to the edge of the deepwater pool; the gap between causeways and landing stage was closed by a specially designed bridge "link," to absorb the tidal range. The construction of the fixed causeways was relatively simple since the bottom was exposed at low tide for a considerable distance from the shore. The total cargo handling capacity of this landing stage-causeway combination was estimated to be 2,500 tons daily.

The remaining 7,500-ton capacity envisaged for the port was to be developed by lighterage from ships moored in the deepwater pool. To provide the necessary unloading facilities, the southerly causeway leading to the landing stage was so designed that it also could be used to discharge lighters. In addition, a floating pier with a bridge "link" to the shore was planned south of the landing stage. To permit the handling of heavy lifts direct from the ships to the railroad, an existing mole, farther to the north, was to be extended into deep water.

So far as construction materials are concerned, the simplicity of the plan also is evident. The floating landing stage and lighterage pier were both designed of naval lighterage pontoons (NLP), the hollow steel cubes developed by the Navy for amphibious operations in the Pacific. The causeways utilized "V-trestline," a prefabricated "meccano-type" structure of British design. The bridge "links" were to be constructed of Bailey bridging. All of these basic items were standard construction materials then available, and no special design or manufacturing problems were involved.

The total weight of construction materials for the port, including those necessary for the improvement of the inland transportation net, amounted to only 29,000 tons. Of this total, however, approximately 7,000 tons represented NLP which could be prefabricated into barges and towed to the site. These barges themselves could carry almost 14,000 tons of remaining materials, so that shipping space was needed for only about 8,000 tons! The construction effort to complete all marine and inland facilities was estimated as approximately 4,000 man-months, with a maximum labor force, at any one time, of less than 2,000 men.

Quiberon Bay *versus* the *Mulberries*

At this point, it may be pertinent to compare the construction effort planned for Quiberon Bay with that required for the *mulberries*. *Mulberries* "*A*" and "*B*" each were designed to handle 5,000 to 6,000 tons a day. Because of damage caused by storms shortly after D-day, *Mulberry* "*A*" ultimately was abandoned. *Mulberry* "*B*" handled a daily average of 6,750 tons. Quiberon Bay, it will be remembered, had been designed to handle 10,000 tons a day.

In the construction of the *mulberries*, more than 150 massive concrete caissons were required, weighing up to 7,000 tons apiece. A labor force of more than 20,000

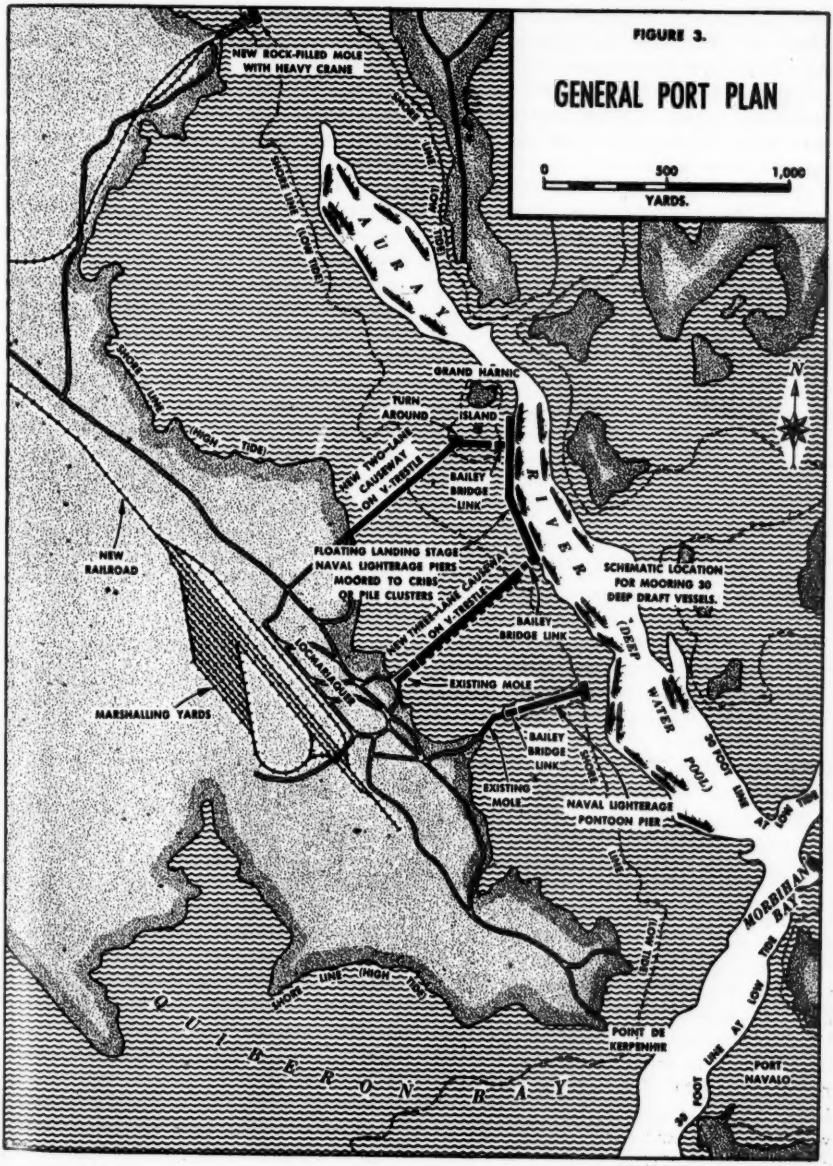


FIGURE 3.
GENERAL PORT PLAN
0
500
1,000
YARDS.
NEW ROCK-FILLED MOLE WITH HEAVY CRANE
SHORE LINE (HIGH TIDE)
AURAY
RIVER
GRAND HARNIC
TURN-AROUND
ISLAND
NEW TWO-LANE CAUSEWAY ON V-TRESTLES
BAILEY BRIDGE LINK
N
NEW RAILROAD
FLOATING LANDING STAGE
NAVAL LIGHTERAGE PIERS MOORED TO CRIBS OR PILE CLUSTERS
SCHEMATIC LOCATION FOR MOORING 30 DEEP DRAFT VESSELS.
(DEEP WATER POOL)
30 FOOT LINE AT LOW TIDE
MARSHALLING YARDS
EXISTING MOLE
NAVAL LIGHTERAGE PONTOON PIER
MORBIHAN BAY
QUIBERON BAY
POINT DE KERPENHIR
PORT NAVALO

men worked only on these caissons for a period of 5 to 6 months. More than 10 miles of piers and causeways were manufactured, utilizing almost 50,000 tons of steel. Sixty ships, displacing nearly 500,000 tons, were prepared for use as breakwaters. By comparison, all the 29,000 tons of construction materials required for Quiberon Bay could be moved to the site in 2 Liberty ships, followed by 10 tugs, each towing a NLP barge!

The foregoing is not intended to detract from the importance of the *mulberries*, nor to imply that they were unnecessarily complicated in view of the conditions under which they were expected to function. The comparison provides food for thought, however, as between building to *withstand* nature, or building in *co-operation* with nature. The merits of the latter course appear to be obvious.

The Plans Are Confirmed

Now, to return to Quiberon Bay; the port, as designed, was approved and accepted by both the tactical and logistical planners. Requisitions for materials were placed, engineer troops were earmarked, and a skeleton headquarters was set up to handle the detailed planning and supervise the construction once the site was uncovered by the combat forces.

With the approach of D-day, enemy port demolitions increased materially, and it became evident that the capacity planned for the new port would be sorely needed. Despite this acceleration of demolitions in existing ports, the enemy continued blissfully unaware of the potentialities of Quiberon Bay. A few strong points were built, some road blocks constructed, and beach obstacles were placed on the more obvious landing areas. This, however, represented the total of the enemy's activities. D-day came and passed. The area finally was uncovered, and early construction reconnaissance confirmed that the port could be built substantially as planned. It appeared that Quiberon Bay was to become a reality!

The Project Is Abandoned

At about this time, however, developments took an unexpected turn. The enemy "holed-up" on the Brittany Peninsula and refused to be dislodged. The eastward advance, in the meantime, proceeded much faster than had been planned. Antwerp was captured virtually undamaged and, with its capture, the enemy's grand strategy of denying the Allies a workable major port met its first and final reverse. After the clearance of the Scheldt River, Antwerp would be able to handle up to 50,000 tons each day, and its location, close to the combat forces, minimized land transportation difficulties.

The Quiberon Bay project obviously was no longer necessary. All plans for its development were, therefore, abandoned although somewhat sadly, it must be admitted, by those responsible for its conception.

Some Lessons of Value

It is apparent that Quiberon Bay, as such, made no material contribution to the success of World War II. From its story, however, may be deduced certain lessons which have application to the logistical support of large, land-mass operations in the future.

First, and possibly most important is the need for *complete intelligence*, covering not only the existing ports, but also all areas in which it is potentially possible to land large tonnages and, subsequently, move them inland. With this as a starting point, an intelligent answer to the initial problem of logistical support can be reached; without it, the best laid tactical plan may fail.

Second, the time to gather such information is now, even though an operation may not be envisaged for 3, 5, or even 10 years. The face of the earth changes

little, and man's efforts to alter it materially do not bear fruit overnight. The two basic factors—shore line characteristics and hydrographic conditions—remain relatively constant over periods of many years as witness the sheltered deep-water pool in the Auray River which furnished a safe harbor for the French invasion fleet of 1759 and which, some 200 years later, could have provided safe anchorage for cargo ships supporting the *Overlord* operation.

Third, this information on existing and potential areas for discharging cargo must be subjected to a *painstaking scrutiny*. With this scrutiny must be combined a lively imagination to determine how the "accidents" of nature may best be turned to serve our ends. The aim should be to exploit the advantages of the least obvious rather than the most obvious solution. As a case in point, had the enemy been alert to the potentialities of Quiberon Bay, and had he expended on it a small fraction of the effort used in demolishing Cherbourg or Le Havre, the area could have been rendered completely unusable as a major port.

Last, *simplicity* must be the keynote. Too often in the past, the logistical planner has been carried away by the magnitude of his own thinking. World War II is replete with examples of unnecessarily complicated solutions to logistical problems. World War III will not permit us the luxury of so taxing our productive capacity. In applying this precept of simplicity, then, what better place to start than with the initial unloading of cargo from ships to the shore.

Quiberon Bay furnishes one example of how such basic simplicity may be achieved. In future operations, a similar combination of *information* plus *imagination* plus *ingenuity* can point the way to other equally simple solutions which involve a maximum reliance on existing natural facilities, and which will permit port operations to be so dispersed that the enemy's use of mass destruction weapons will no longer be a controlling factor.

I am confident that an Army of strong individuals, held together by a sound discipline based on respect for personal initiative and rights and dignity of the individual, will never fail this Nation in time of need.

General J. Lawton Collins

First With The Most

Lieutenant Colonel Robert J. Hill, Jr., *Artillery*
Instructor, Command and General Staff College

THE *timely* concentration of military power always has been a key to victory on the field of battle. In offensive action, a commander normally masses his means, and launches a deliberate attack with the full force of his command in the decisive direction, at the proper place and time. Maximum combat power thereby is committed against the enemy where conclusive action is foreseen.

Will a commander who does not wait to assemble the full power of his command, prior to attack, violate the principle of mass? Not always; for the balance of victory frequently is tipped in favor of the commander who is able to employ his forces *more quickly* than can the enemy. Success may go to the force which builds up an *initial* superiority of combat means, and then maintains this advantage to the objective. Thus, an attack with a portion of the force may be dictated, in order to gain time, while the remainder of the command arrives. Such a commitment is known as a *piecemeal* attack.

Definition

A piecemeal attack is an offensive action in which various elements of a force are committed to combat as they become available. It differs from the "co-ordinated" attack in which all elements are available to influence the battle from the outset. However, one cannot infer that a properly executed piecemeal attack lacks co-ordination. The major difference between these attacks is the initial availability of elements of the force; *not* the amount of co-ordination involved.

Conditions for a Piecemeal Attack

Basically, there are three circumstances which should exist before a commander can justify a piecemeal attack. These are: time must be working in favor of the enemy; combat superiority—a preponderance of combat means over the enemy forces—must be present at the initiation of the attack; and this combat superiority must be maintained until the objective of the attack is reached.

Time Must Be Working in Favor of the Enemy

Under this circumstance, a delay of the attack, until the deployment of the whole command is complete, will result in a greater advantage to the enemy than to friendly forces. It allows the enemy to strengthen himself as fast or faster than friendly forces. This situation forces a commander to take action which either will prevent the enemy from accomplishing his build-up of forces, or will defeat him in detail prior to arrival of reinforcements. Inherent in such actions is the risk of defeat in detail of friendly forces.

Combat Superiority Must Be Present Initially

A commander weighs carefully the situation in order to determine how he is superior to the enemy. He must employ this

superiority in a manner which exploits its capabilities to the maximum. Conversely, his analysis must include a careful estimate of the enemy's combat means in order that his plans provide for overcoming them in the most efficient manner. Frequently, a commander's combat superiority will lie, not in infantry strength, but in armor or artillery (giving superior fire power), or in engineers and transportation (providing superior mobility). In any case, the commander must assure himself that his planned attack utilizes all forces to the maximum, in order to secure a workable combat superiority when the piecemeal attack is launched.

Combat Superiority Must Be Maintained to the Objective

In addition to having an initial advantage in combat means, the commander must be able to foresee and ensure this preponderance throughout his attack. Again, emphasis is placed on the term "superiority of means," rather than on mere numerical superiority. As mentioned above, in modern warfare, superiority of fire power, mobility, morale, supplies, or other means may prove more desirable than mere numerical strength. Frequently, only aggressive action will convert an initial tactical advantage to one which will remain throughout the duration of the attack. This involves the co-ordinated, expeditious employment of the remainder of the force as it becomes available in the later phases of the attack. Paramount to the co-ordinated employment of the remainder of the force is the necessity for a plan of maneuver in which these forces can be committed in an extension of the original attack, without a break in continuity.

Plans

The necessity for the rapid entry of forces into combat, after the attack is launched, requires that the commander plan well in advance for the commitment of all elements of his command, as they arrive on the field of battle. He ensures that the plan of attack which is adopted provides for the smooth employment of the remainder of the command in an increasingly powerful main attack directed at the decisive objective.

Detailed plans are made as far in advance as possible so that units, arriving after the start of the attack, will consume little time in entering combat. These plans include provisions for battlefield reconnaissance for subordinate units, the issuance of necessary supplies, and the rapid integration of fighting teams.

Intelligence

Underlying the three conditions necessary for a piecemeal attack is the requirement for timely and accurate information of enemy dispositions and capabilities. In a piecemeal attack, the commander is forced to take the risk of being defeated in detail. To reduce this risk, strenuous efforts are made to collect and evaluate enemy information. All agencies available to the commander are exploited to learn quickly the enemy's combat strengths and reinforcing capabilities. The use of air force reconnaissance agencies are particularly desirable to report the movement of enemy forces into and within the battle area. Frequently, however, the commander, because of his mission and incomplete information of the enemy situation, must attack, assuming that one or more of the conditions for a piecemeal attack are

Does the piecemeal attack violate the principle of mass? Not always; for the balance of victory often is tipped in favor of the commander who is able to employ his forces more quickly than can the enemy

present. This especially is true in meeting engagements and similar actions, where the lack of enemy information will be the rule rather than the exception. Here, the need for the early development of the situation overrides the desirability of complete enemy information prior to making the piecemeal attack. Furthermore, in this type of action, the presence of friendly reserves lessens the risk of being defeated in detail.

Illustrative Example

To illustrate the technique of conducting a piecemeal attack and the conditions which should be present when it is made, the following example is presented in which an infantry division is involved in what is essentially a meeting engagement.

General Situation

Blue.—(See Sketch Map 1.) Blue I Corps, part of the First Army, is composed of three infantry divisions and corps troops and is organized similarly to United States forces. It has been attacking to the northeast. On 6 June, it broke through the Red defensive positions in the vicinity of M. The I Corps then was ordered to advance rapidly in its zone, seize the line of the X River, and be prepared for further offensive operations to the east. The 20th Infantry Division, reinforced, the covering force for the I Corps, has been advancing against light opposition. It has the mission of covering the advance of the I Corps, and of seizing the line of the X River.

Red.—Up to 6 June, Red resistance had been stubborn. Skillfully conducted delaying actions have given him time to regroup and constitute a reserve which has been assembling east of the X River in the vicinity of Charlestown. This force is estimated by Blue higher headquarters to be one armored and three infantry divisions, with supporting troops. Red forces are organized similarly to Blue. Red is short of gasoline which has limited the effective use of his armor and transportation.

Air.—The Blue air forces have gained air superiority. The G2, First Army, estimated that Red air can attack anywhere in the army zone with a maximum of 100 medium bomber and 300 fighter bomber sorties daily.

Special Situation, 20th Infantry Division

1. The 20th Infantry Division has the following attachments:

201st Light Armored Regiment
684th Field Artillery Battalion (155-mm Howitzer)
751st Tank Battalion (90-mm Gun)
752d Tank Battalion (90-mm Gun)
Sufficient motor transportation to motorize the division completely.

2. The division is advancing in three parallel columns. The 201st Light Armored Regiment (with the 20th Reconnaissance Company attached) is protecting the front and flanks of the division.

3. Combat team (CT) formations are in effect within the division. Combat teams (with attachments) are organized as follows:

CT 58 (North Column)	*CT 59* (South Column)	*CT 60* (Center Column)
58th Infantry (—2d Battalion)	59th Infantry	60th Infantry
77th Field Artillery Battalion (105-mm Howitzer)	78th Field Artillery Battalion (105-mm Howitzer)	79th Field Artillery Battalion (105-mm Howitzer)
Co "A," 20th Engineer Combat Battalion	Co "B," 20th Engineer Combat Battalion	Co "C," 20th Engineer Combat Battalion
	751st Tank Battalion	20th Tank Battalion
	684th Field Artillery Battalion	80th Field Artillery Battalion (155-mm Howitzer)

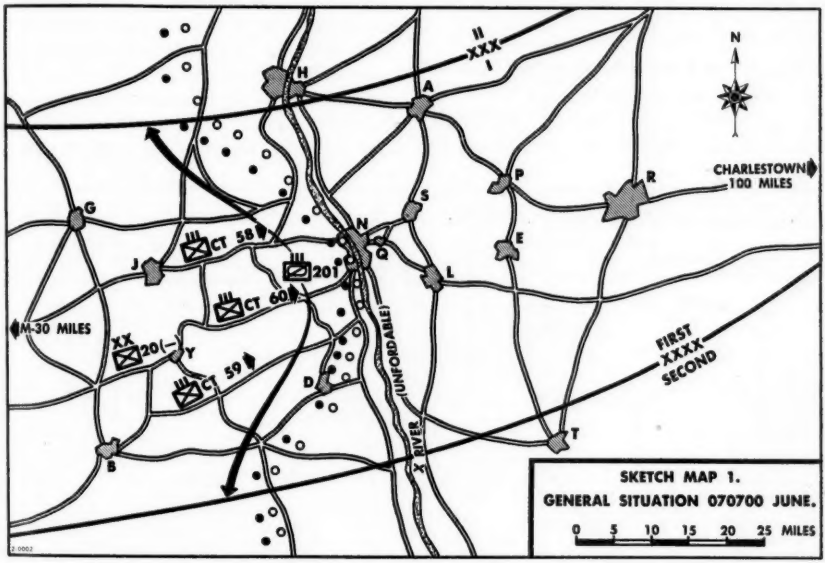
Significant Events up to 071000 June

1. *Blue.*—(See Sketch Map 2.)

a. At 070700 June, the 201st Light Armored Regiment seized intact the highway bridge at N over the X River. The I Corps commander directed the 20th Infantry Division to cross the X River, drive

Red east of the Z Creek, and cover the movement of the remainder of the corps across the river.

b. The Commanding General, 20th Infantry Division, ordered the Commanding Officer, 201st Light Armored Regiment, to advance east until passed through by CT 60, then to protect the flanks of the division. CT 60 then was directed to cross the X River without delay, pass through the 201st Light Armored Regiment, seize the high ground at 659, drive Red east of the Z Creek, and cover the movement of the remainder of the division over the river.



c. CT 60 started to cross the river at 0730. By 0900, the 201st Light Armored Regiment had advanced, against some opposition, to a line 1 mile west of S where it was stopped by road blocks and small-arms, mortar, and artillery fire coming from the direction of S. The advance guard of CT 60 (the 1st Battalion, 60th Infantry, reinforced) detrucked and attacked through the 201st Light Armored Regiment, at 0945, along the main road with orders to advance rapidly and develop the situation. Meanwhile, CT 60(—) closed in an assembly area northwest of S, while its two artillery battalions took up positions and began firing. The 2d Battalion, 60th Infantry, was ordered to a forward assembly area to be prepared for commitment on the north flank of the 1st Battalion.

d. At 0955, CT 59 was ordered to cross the river without delay and move into an assembly area north and west of S. CT 58 and the division troops were ordered to follow CT 59, in that order, across the X River.

2. *Red.*—*a.* Based on prisoner interrogation and other sources, the G2, 20th Infantry Division, estimated that elements of the 12th Red Infantry Regiment, supported by artillery, were disposed in the vicinity of S and Hill 470. No armor other than reconnaissance vehicles had been reported.

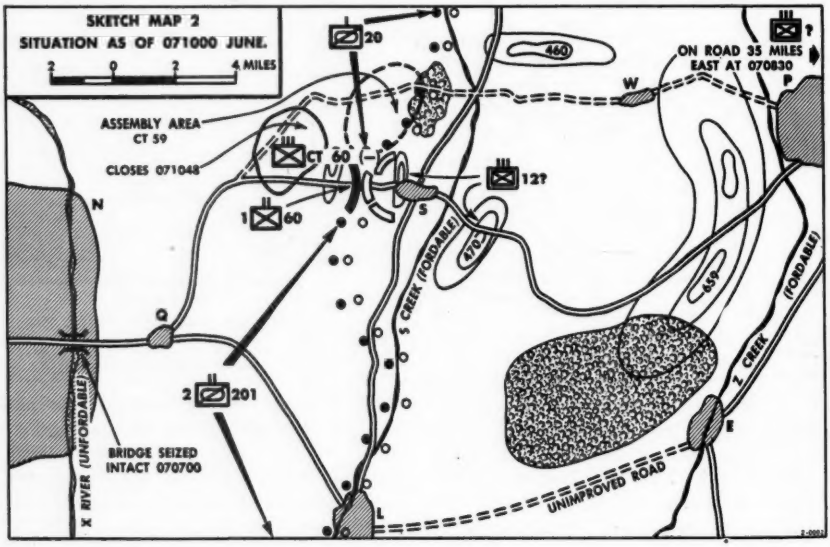
b. At 0900, Blue air reconnaissance re-

ported a column of trucks and other vehicles (estimated at from 200 to 225) moving west on the main highway to P. They were located approximately 35 miles east of P at 0830. Tanks and artillery were reported in the column. The G2 estimated this force to be a Red infantry regiment reinforced with artillery and tanks.

Significant Events up to 071300 June

1. *Blue.*—(See Sketch Map 3.)

a. By 071100 June, the 1st Battalion, 60th Infantry, had driven patrols out of



S, and had encountered strong fire from Hill 470. The 2d Battalion, 60th Infantry, had been committed on the north flank, at 1110, with the mission of seizing Hill 470 and of being prepared to continue the attack. Initially, the progress made was good, but, by 1300, the attack of both battalions was being brought under heavy small-arms, mortar, and artillery fires.

b. At 1120, the Commanding General, 20th Infantry Division, alerted CT 59 for an attack around the north flank of CT 60 on division order. The Commanding Officer, CT 59, estimated that he could attack no earlier than 1500.

c. At 1250, the Commanding General, 20th Infantry Division, was informed by the Commanding Officer, CT 60, that he planned to commit the 3d Battalion and the 20th Tank Battalion in an attack to seize Hill 659. He stated that this attack could be launched by 1430.

d. At 1255, the Commanding General, 20th Infantry Division, was informed that Red air had attacked the highway bridge at N while service elements of CT 59 were crossing. While no extensive damage to the bridge or losses to CT 59 were reported, the approaches and superstructure of the bridge were damaged. It was estimated that CT 58 and the division troops would be delayed 2 hours in crossing the X River and closing in their assembly areas.

2. *Red.*—*a.* At 1100, the I Corps reported that a Red motorized force of regi-

mental size or larger, and composed of all arms, was moving west on two roads. At 1050, the heads of these columns were approximately 30 miles west of Charlestown [100 miles east of R (Sketch Map 1)]. The I Corps is taking steps to have the target attacked by air.

b. At 1200, Blue air attacked the wooded area west of Hill 659 where enemy activity was noticed. Large numbers of trucks and soldiers were seen. Blue air also reported the soldiers were digging on Hill 659.

20th Division Staff Conference 071300 June

Since 071000 June, three significant events had occurred which caused the Commanding General, 20th Infantry Division, to reconsider the courses of action which were open to him. These significant events were:

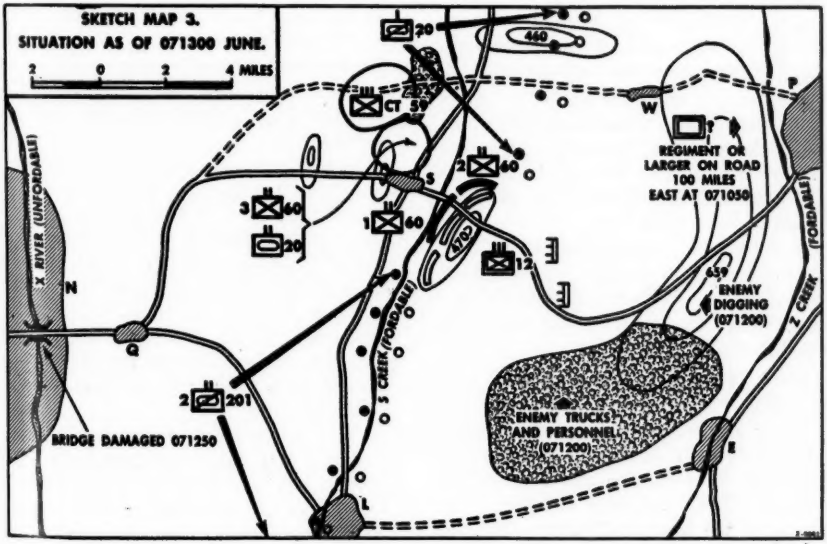
1. The apparent arrival of Red's second infantry regiment supported by tanks and artillery.

2. The movement of a force of undetermined strength from Charlestown.

3. The 2-hour delay in the arrival of the remainder of the division, caused by the damage to the bridge at N.

These circumstances radically changed the situation for the commander of the 20th Infantry Division. Prior to this time, based on available intelligence, he had had the opportunity to cencentrate his force east of the X River and attack with a decided superiority over Red. However, the additional Red reinforcement capabilities, coupled with the delay in the arrival of the remainder of the 20th Infantry Division, now makes time work for the Red forces.

Because of these events, the commander called his staff together for a re-examination of the situation. His staff presented their estimates to him, extracts of which follow:



1. *G2—Enemy capabilities.*

a. Red can attack now, anywhere on our front, enveloping our north or south

flank with an estimated three infantry battalions supported by one field artillery battalion.

b. Red can defend his present position with the forces mentioned in *a* above.

c. Red can reinforce his attack or defense (*a* and *b* above) as follows:

(1) With an infantry regiment, supported by artillery and tanks, at any time after 1400.

(2) With a force of regimental size or larger, composed of all arms, from Charlestown, at any time after 1800.

d. Red can withdraw and defend Hill 659 with the forces mentioned in *a* above. He can reinforce this defense of Hill 659 as follows:

(1) With an infantry regiment, supported by tanks and artillery, at any time after 1300.

(2) With a force of regimental size or larger, composed of all arms, from Charlestown, at any time after 1735.

2. *G3—Own courses of action.*

a. The division attacks at 071500 (with the 59th and 60th Infantry Regiments) in the direction Hill 460—Hill 659, seizes Hill 659, and drives Red east of the Z Creek.

b. The division attacks at 071915 (with the 58th, 59th, and 60th Infantry Regiments) in the direction Hill 460—Hill 659, seizes Hill 659, and drives Red east of the Z Creek.

3. *G1 and G4*—All courses of action can be supported.

The division commander, after considering these estimates, made the following decisions: "The division attacks at 071500 (with the 59th and 60th Infantry Regiments) in the direction Hill 460—Hill 659, seizes Hill 659, and drives Red east of the Z Creek." Accordingly, he directed that the combat team formations be dissolved, and issued fragmentary orders for the attack.

Discussion

In the preceding example, two illustrations of a piecemeal attack were presented. In the first case, the commander of CT 60 committed piecemeal the 1st and 2d Battalions of the 60th Infantry, and was preparing to use the remainder of CT 60 when the division commander directed the division attack. In the latter example, the 20th Infantry Division launched an attack without CT 58 and the other elements of the division. Both of these actions are instances when such an attack is necessary and justified. The remainder of this discussion will be confined to an examination of that course of action in which the 59th and 60th Infantry Regiments were employed.

Courses of action considered but rejected by the G3.—Prior to presenting the two courses of action to the commander, the G3 considered several other courses of action but discarded them. These included:

1. *An attack with CT 60 alone.* It was rejected because the necessary initial combat superiority would not have been present. The G2 estimated that two Red infantry regiments could be present prior to the time CT 60 could attack. Furthermore, a delay of only 30 minutes would allow CT 59 to join in a co-ordinated attack.

2. *A penetration of the enemy position on Hill 470.* This was discarded because Hill 470 appears to be a strong position with well-organized defenses. Further, an envelopment of the Red north flank could be launched as quickly. As the penetration obviously was inferior to an envelopment, it was discarded.

3. *An envelopment of Red south flank.* This also was discarded because of the heavy woods on the south slopes of Hill 659. These woods could serve as an obstacle to the effective employment of our armored superiority (one or more tank battalions). Thus, as such a course of action would not take maximum advantage of this valuable asset, it was rejected as being obviously inferior to others.

Comparison of courses of action.—After the staff estimates, the commander con-

sidered the courses of action presented by the G3 and compared them. He considered that the "composition of forces" (a comparison of the means available to the opposing forces), the "enemy capabilities" (the ability of the enemy to interfere with the accomplishment of the mission), and his own dispositions were the factors which must influence his thinking when comparing his courses of action. He realized that in this attack, time was the most important element involved in his decision. (Time, not as a factor itself, but as a function of the enemy's ability to stop his attack, and his own ability to reinforce the attack.) With these thoughts in mind, the commander compared the two courses of action open to him as follows:

1. *Composition of forces.*—The attack with the 59th and 60th Infantry Regiments, at 1500, is more favorable than the attack with entire division at 1915. The early attack gives us an initial superiority over the enemy of one or two tank battalions and the same number of medium artillery battalions. In addition, we are more mobile than Red. This initial superiority will continue until the enemy force from Charlestown can arrive. Thus we have a minimum of 2½ hours in which to press home our attack during which time we will possess superior means. If we decide to attack with the entire division, then the force from Charlestown can arrive before our attack is launched. Thus, by 1915—if this enemy force is no larger than a regimental combat team—we will have the same superiority that we had at 1500. However, if this force is larger than a combat team, our combat superiority will be less than at 1500. In addition, if the latter is true, between 1800 and 1915 the enemy will be superior to us. Hence, by attacking at 1500, we take greater advantage of our initial combat superioriy. We are offered the chance of defeating the enemy force and achieving our objective before the force from Charlestown can arrive. This opportunity does not exist if we attack at 1915.

2. *Enemy capabilities.*—The attack with the 59th and 60th Infantry Regiments is more favorable than the attack with the entire division. The earlier attack gives the enemy 4 hours less time to improve his defense of Hill 470, Hill 659, or both. Furthermore, it gives the enemy less time with which to implement his reinforcing capability. An enemy attack, prior to our attack at 1500, with one or two regiments can be stopped, and ultimately will work to our advantage. However, an enemy attack, prior to 1915, with all forces available to the enemy not only may prevent the accomplishment of our mission, but also could jeopardize our entire position. Only in the earlier attack can this eventuality be prevented.

3. *Own dispositions.*—Obviously, a coordinated attack with the entire division is more favorable than a piecemeal attack. The earlier attack also gives us four more hours of daylight in which to fight, which favors the employment of our armor. However, in the later attack, the entire division will be present and thus it cannot be defeated in detail.

4. *Conclusion.*—The piecemeal attack at 1500 offers the best chance of accomplishing our mission because the enemy is not offered as favorable an opportunity to interfere, either by his attack or defense. A delay in our attack will give the enemy the chance to strengthen his defense or to prepare for his attack. It will reduce our initial combat superiority, and may force us to attack against a superior force. Lastly, a delay reduces the number of daylight hours in which to drive home our attack, an attack which should be made when we are superior in armor and artillery.

Summary

There are occasions in battle when it is necessary to attack even though the entire command is not available. When

this occurs, the commander resorts to a piecemeal attack. The conditions which are necessary for such an attack are:

1. Time must be working against friendly forces and in favor of the enemy.

2. The commander must have a superiority of combat means at the outset of the attack.

3. This combat superiority must be maintained to the objective.

Frequently, lack of enemy information may force the commander to assume that one or more of these conditions are present. For this reason, every effort is made to improve the available information of the enemy in order to remove this risk.

NEXT MONTH

Main Articles

How Crete Was Lost—Yet With Profit by Captain B. H. Liddell Hart; and *Reduction of the Colmar Pocket—A 6th Army Group Operation* by Colonel Jonathan O. Seaman are included among the main articles.

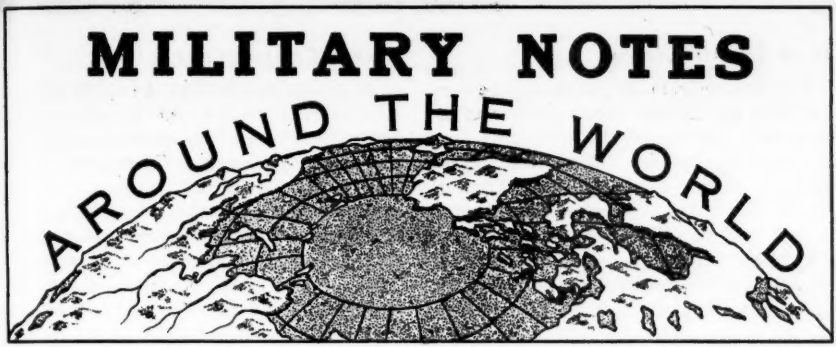
Foreign Military Digests

The foreign digests include "Soviet Tactical Tendencies" from the *Revue Militaire d'Information* (France); and "The Application of the Principles of War to Air Power" from *The Journal of the United Service Institution of India.*

Books for the Military Reader

Reviews of *A Soldier's Story* by General Omar N. Bradley; and *Military Attaché in Moscow* by Major General Richard Hilton are included.

MILITARY NOTES AROUND THE WORLD



UNITED STATES

Surplus Items

Utilization of excess government property, which can no longer be used by the Army, Navy, or other Federal agencies, is saving the Air Force about 6 million dollars annually.

Among the items being saved are copper, aluminum, brass, nickel, and steel—all scarce because of the emergency—as well as other government property except land, buildings, and naval vessels.—*The New York Times.*

Antimalaria Drug

A new antimalaria drug has been developed which is 1,000 times as powerful as quinine and at least 100 times as powerful as atabrine, the drugs used in greatest amount in World War II.

An ounce of the substance would constitute a 5- to 10-year supply for the average patient.

The drug is being tested on malaria victims in Nigeria, Africa. It is in the advance experimental stage and development of production facilities is being started, but the drug is probably a year away from commercial marketing.

It is made of raw materials available for mass production—materials derived largely from coal distillation.—*Science Digest.*

Lift Radar Ban

The United States has lifted a ban on the export of $1,540,000 worth of radar for neutral Sweden's Air Force. The United States had refused to grant an export license on the ground that radar was more urgently needed by the Atlantic Pact countries.—News release.

Airborne Grader

The Navy has developed a power grader that fulfills military requirements for a lightweight, heavy-duty machine for use in forward areas where terrain may vary from stable ground to mud and sand, and where roads are likely to be winding and precipitous.

The new grader, developed for airborne transportation, weighs 17,025 pounds, which is about 5,000 pounds under the weight of larger, heavy-duty commercial graders.—*Army Navy Air Force Journal.*

Rebuild Greenland Bases

The Department of Defense has announced that Army engineers and the Air Force soon will begin rehabilitation and construction work on United States military bases in Greenland. The construction will be carried out under the new defense agreement between Denmark and the United States.—News release.

Snow by Air Friction

The outside skin of jet planes gets so hot from air friction that snowstorms occasionally fall inside the cockpit.

Unless air cooling is used, the cockpit becomes a bit of insufferable tropical humidity. If the pilot delays in turning on the cooling, the sudden temperature change may cause a snowstorm that cuts visibility.—News release.

Variable Wing Plane

The first United States Air Force plane with variable swept-back wings, the Bell *X-5*, recently completed its first flight.

Unlike the rocket-powered *X-1*, also built by Bell, the *X-5* is jet-propelled and will be capable of sustained flights over long periods of time. It will take off from the ground under its own power instead of being launched from a "mother" plane of the *B-29* or *B-50* type, as was the *X-1*.

The *X-5* will be used as a flying laboratory to investigate aerodynamic effects of changing the degree of wing sweepback during flight. The swept-back plane will have all the advantages of conventional wing aircraft in take-off and climb, maneuvering and endurance, and will be capable of very high speeds.

The new plane is the result of 3 years combined research and development by Air Force and civilian engineers.—*Armed Force.*

Sleeping Pads

The Army and Marine Corps have ordered thousands of air-inflated sleeping pads for use in combat areas.

Constructed of nylon fabric and rubber specifically designed to resist cracking in cold weather, the lightweight insulating pads can be inflated in a few moments.

The pads are 76 inches long, 27 inches wide, and 3 inches thick, and will enable infantrymen to keep dry and comfortable even in front-line foxholes.—News release.

Rocket Computations

If anyone doubts that the earth rotates, let him try aiming one of the record-breaking 250-mile-high rockets being fired by the Army Ordnance Corps from White Sands Proving Ground.

If the earth's rotation were disregarded, such a "Bumper" two-stage rocket would descend approximately 15 miles from its target. The earth would move that far under it during the 10 minutes that it is in the air.

There are approximately 10 variable factors taken into consideration when high-altitude rockets are fired. In addition to the rotation of the earth, these include range and direction of the target, trajectory, geography, wind direction, wind velocity, and air density.—*Science News Letter.*

New Jet Fighter

The first operational jet fighter plane to roll off the production line fully equipped for midair refueling by tanker plane was announced recently by Republic Aviation Corporation.

The new plane is designated the *F-84G* and features several new improvements over its more famous battle-tested sister model, the *F-84E Thunderjet*, which is currently in service in Korea, Europe, England, and the United States. It has longer range, faster climb, and provides for easier maintenance.

Single-point in-flight refueling as featured by the *F-84G* heralds the beginning of an era of increased flexibility and mobility for United States Air Force fighter forces. It means that complete fighter wings can be moved quickly from one part of the globe to another, that they can strike deeper into the territory of an aggressor, or, with heavy loads of armament, they can hover "on call" for longer periods over battle lines ready to blast enemy targets for friendly ground troops.—News release.

Packaging Schools

Packaging of military supplies and equipment will be taught to military and civilian personnel in several regional schools sponsored by the Defense Department, through the Munitions Board Packaging Agency.

No exact locations for the schools have been announced, but several widely scattered educational institutions are being considered as sites. Each school would train 1,800 to 2,400 persons each year.—*Armed Force.*

Radio Transmitter

Surer information concerning weather and other matters, picked up by telemeter instruments in speeding pilotless rockets, will be received by ground based stations as a result of a recently developed radio transmitter.

The transmitter is about the size of a cigarette package and has a range of 20 to 100 miles, depending upon its distance from the ground. The range is 20 miles at sea level, and 100 miles at elevations of 10,000 feet or more. It operates in the 200 megacycle band, has a power output of 2 watts, and has low distortion and high stability.—*Science News Letter.*

Air-Ground Instruction

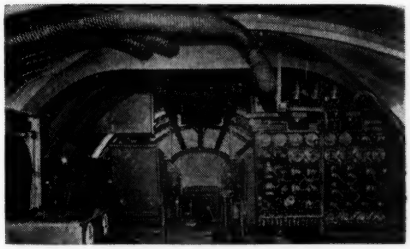
Joint air-ground instruction designed to teach troops the proper methods of calling for air strikes against enemy troops and to train Air Force units to carry out tactical air support is being conducted at all Army units of battalion size or larger in the United States.

Each unit is given instruction and actual battalion exercises combining ground unit activities with air cover. Firing exercises complete the course.

Instructors are from the Tactical Air Command's Ninth Air Force and the Army Air Support Center, Fort Bragg, North Carolina.—*All Hands.*

Flight Simulators

Air Force pilots of the future soon will be able to fly more confidently and safely than has been possible since the advent of the jet engine. The devices that will make this possible are flight simulators—designed to duplicate the cockpits of the *B-47*, *B-36*, and *B-50D* bombers; the *C-124* and *C-97* cargo planes; and the *F-86D* all-weather interceptor.



Above, the exterior of a typical flight simulator on order by the Air Force. Below, the interior of a typical flight simulator, showing controls for the pilot and copilot.

Up to the present time, only a one-station simulator was available to the Air Force; the Link Jet Trainer, which simulates the flight of the *F-80 Shooting Star.* This was designed for basic transition training from reciprocating engine aircraft to jet planes.

The new devices will contain controls for the pilot, copilot, and flight engineer, where applicable, and will give training on a specific airplane.—Air Matériel Command.

Blimp Propeller

A propeller designed to let Navy blimps fly backward has been developed by the Curtiss-Wright Corporation.

The backward flying will not be for any great distance, but will permit blimps to stop and really stand still, regardless of wind. The idea is to help in search for enemy submarines.

The propeller blades are fitted with electrical controls that change their pitch anywhere from forward flight, to zero, and on through straight backward.—*The New York Times.*

Fighter-Bomber

A single-seat, fighter-bomber version of the *F-94*, designated the *F-94D*, has been ordered into production.

The new fighter-bomber will be similar to the *F-94C* interceptor in appearance and will be powered by the Pratt and Whitney J-48 jet engine which is rated at 6,250 pounds of thrust.—*Army Navy Air Force Journal.*

Jet Starter

Cordite cartridges are being used to start jet airplane engines. The jets require about 10 times the energy input needed for starting piston engines of comparable horsepower. Each starter unit has two cartridge barrels and a small turbine. A firing button ignites one of the cartridges and its gases start the small turbine, which in turn accelerates the main jet turbine to self-sustaining speed.—*Popular Mechanics Magazine.*

Manpower Estimates

The Bureau of Census estimates that there are 25,619,000 males in the United States under 19 years of age.

The bureau said that lowering the draft age from 19 to 18 would make eligible for Selective Service 1,088,000 more men. There are about 1,052,000 17-year-olds.—News release.

Assault Transport

"A substantial number" of twin-engine *C-123* assault transport aircraft will be procured by the Air Force for use in training, transporting, and supplying Army assault troops.

The *C-123*, which is designed to operate from small, unprepared fields in forward combat areas, is expected to eliminate many of the problems encountered when airborne units and their equipment are flown in gliders, or when the heavy equipment is delivered by air drop. The plane can be used to replace the gliders formerly used to support airborne units, and, once having delivered troops or equipment to a forward point, it can take off for the rear again to pick up other loads. If necessary, the *C-123* also could be flown overseas, conserving valuable shipping space which otherwise might be required for gliders.—*Armed Force.*

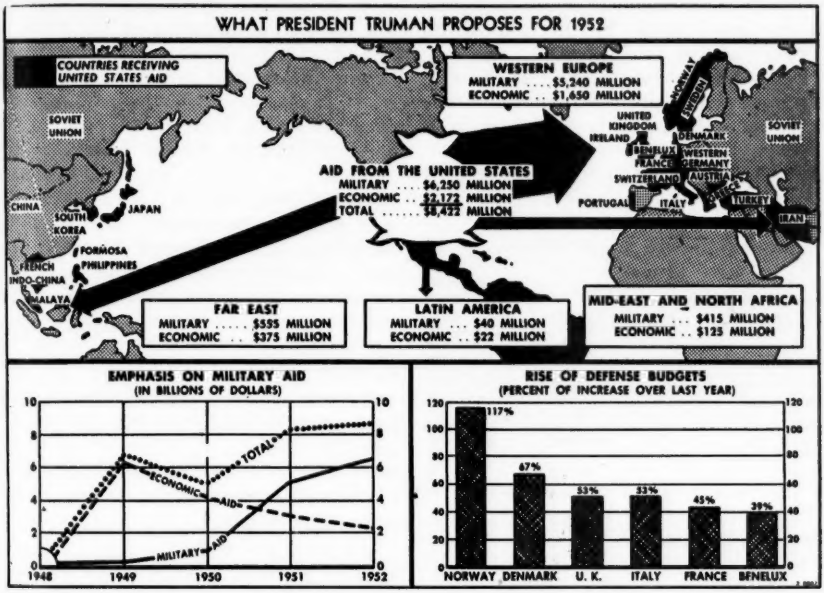
A Photographic Problem Solved

A new photo processing method which completely eliminates the necessity for washing films and prints has been developed by the Signal Corps. In practice it solves a major combat photographic problem of securing adequate supplies of fresh water in battlefield areas.

Use of the process, known as stabilization, permits processing time to be cut to a minimum. By eliminating the necessity for washing, plus use of specially formulated Amidol developer, stop bath, and stabilizer solutions, processing is about 10 times faster for film and about twice as fast for prints. In conventional processes, washing films ordinarily takes a half-hour, prints at least an hour.

The saving in water normally used for washing is tremendous. A single typical field photographic laboratory consumes about 3,000 gallons of water each day.—News release.

United States Mutual Security Program—And What Our Allies Are Doing



The thickness of the arrows in the top map is in proportion to the amount of military or economic assistance proposed for each area. While the countries shaded in black would be the principal recipients of aid under a program recently outlined by President Truman, many others might become eligible for US assistance.—*The New York Times.*

Synthetic Gasoline

More than 300,000 gallons of high octane synthetic gasoline will be refined from coal by the Bureau of Mines for testing in Army trucks and other equipment.

The gasoline will be obtained from oil derived from Western Kentucky bituminous coal. The bureau already has converted 2,600 tons of Kentucky coal to synthetic oil during a 2-month run at its coal-hydrogenation demonstration plant at Louisiana, Missouri.

The research is part of a program to test whether American-built commercial plants can feasibly make synthetic liquid fuels from coal.—News release.

World's Largest Blimp

The world's largest nonrigid airship recently completed its first flight.

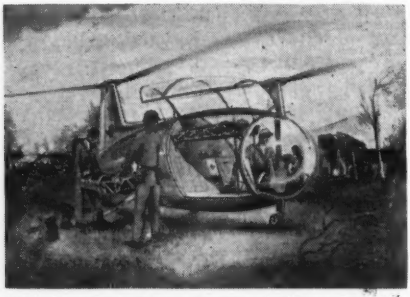
The 324-foot craft, with a capacity of 875,000 cubic feet of helium gas, was designed for antisubmarine work. It is expected to be able to attain an air speed of 75 knots an hour, as well as maintain slow hovering speeds.

The craft, under construction for 2 years, has been designated by the Navy as type ZPN. The type K, with a capacity of 456,000 cubic feet, was used against submarines during the last war. A later type M had a capacity of 725,000 cubic feet, and was able to stay aloft for more than a week.—News release.

'Heli-Jeep'

The latest helicopter design proposed to the armed forces by the Rotor-Craft Corporation is a "Heli-Jeep."

There are several versions of the new craft, designed to fit the particular needs of combat. One model is intended to rush



Artist's conception of an ambulance version of the "Heli-Jeep" being used in combat.

personnel armed with recoilless rifles and bazookas to strategic positions before they can be reached by enemy ground forces. Another is intended as a staff vehicle to provide greater flexibility of movement to commanders. The third model, an ambulance jeep, will carry two stretcher casualties, the pilot, and a medical corpsman.

The "Heli-Jeep" design was developed to improve the utility of helicopters already battle-proved on the Korean front. Jeep simplicity and ruggedness are outstanding features of the design, intended to require a minimum of field maintenance.—*American Helicopter.*

Philippines Aid

The Economic Co-operation Administration (ECA) has announced that it will give the Philippine Islands a further allocation of $419,000 to assist the agency's aid program there. This authorization will bring the ECA allotments on this program to more than a million dollars.—News release.

Diesel Engine

A radial-type Diesel engine is ready for use in the operation of the Nation's newest attack submarines.

Most information on the compact power plant is classified, but the following details have been made public: the engine is a 16-cylinder, 2-cycle type, mounted vertically, with four rows of cylinders branching out in radial design. Construction is of welded steel. The plant is described as the lightest Diesel in its power range, weighing about half as much as submarine engines the Navy has been installing.—*Armed Force.*

Battery Tester

A tester which gives an instant check on a storage battery's condition—knowledge of which is vital for proper automobile and communications equipment performance—has been developed by the Army Signal Corps.

Heart of the tester is a specially designed indicator. When used with vehicles, the indicator easily can be adapted for mounting on the dashboard or steering wheel column to tell the driver if there is enough "juice" in the battery to start the engine. In central depots, the new tester will be used to test hundreds of batteries in a fraction of the time needed for ordinary testers—thus saving countless man-hours needed elsewhere on the fighting front.

The tester, the only one of its kind in existence, combines many separate functions performed by other testers. In automatically registering the battery's health, the new tester reveals the amount of charge, at what temperature the battery will freeze, whether it is getting too much charge from the generators, and whether an extra load, such as produced by a car's radio, heater, headlights, cigarette lighter, or clock, is dragging strength below the danger point.—News release.

CANADA

Navy Ships

Canada's Defense Minister has announced that 12 new ships, in addition to the orders already placed, will be built for the Royal Canadian Navy at a cost of 60 million dollars.—News release.

Bombing and Gunnery Range

Agreement has been reached with the provinces of Alberta and Saskatchewan for establishing a large Royal Canadian Air Force bombing and gunnery range 100 miles northeast of Edmonton.

The range will cover an area of several thousand square miles. Air Force officials said it is necessitated by the high speed of modern jet aircraft and the long range of their weapons, including rockets and cannon, which result in a large increase in the danger area.

The new range also will be used in connection with the development and evaluation of various forms of air weapons, including air-to-air rockets.—*Canadian Aviation.*

KOREA

POW Mortality Rate Low

The United States Army Medical Service has announced that only 7 percent of about 37,000 wounded and captured Communist soldiers in Korea brought into United Nations hospitals died during the first 6 months of this year.—News release.

Flame-Throwing Mine

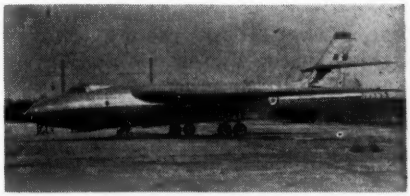
United Nations troops in Korea have devised a new type of "flame thrower." It is a 55-gallon drum of napalm-like substance planted in the ground like a mine and covered with a light layer of dirt. Attached to the bottom of the drum is an explosive charge with wires running to a detonator inside friendly lines.—News release.

GREAT BRITAIN

RAF Four-Jet Bomber

The first of Britain's series of multi-engine jet bombers, the *Vickers 660,* has made its first flight and is in quantity production for the Royal Air Force. It is powered by four Rolls-Royce Avon engines.

The new bomber is faster than the twin-engine *Canberra* and has greater bombload



The *Vickers 660,* Britain's first four-jet bomber.—Vickers-Armstrong photograph.

and range. When in service, it will replace the RAF's *Lincoln* and *B-29* piston engine bombers, and the services will be well on the way to becoming completely jet-equipped. Fighters, night fighters, all-weather fighters, trainers, *Canberra* tactical bombers, heavy bombers, naval all-weather and strike fighters, and anti-submarine aircraft all will be jets.—*Army Navy Air Force Journal.*

Radio Chain

Great Britain has started operating a chain of radio transmitting stations to provide simpler and safer navigation for ships and planes approaching the British Isles.

The chain, erected under the authority of the British Government, consists of a master station in South Scotland and three "slave" stations in North Ireland, West England, and East Scotland. The stations will send out continuous beams to allow pilots to fix their positions accurately in all weather up to 300 miles offshore.—*The New York Times.*

CZECHOSLOVAKIA

Border Project

German border police have reported that Czechoslovakia is burning and dynamiting schools, churches, farmhouses, and even entire villages to create a "no man's land" along its 200-mile border adjacent to Bavaria.—News release.

Trade Pact

A trade agreement has been signed between Czechoslovakia and Eastern Germany.

According to the agreement, Eastern Germany will deliver important raw materials, especially for the chemical and rubber industries, fertilizers, and investment goods.

Czechoslovakia will export foundry and heavy industry products such as coke, rolled stock, refractory materials, and other industrial goods.—News release.

Railway Sabotage

The Deputy Secretary General of the Czechoslovak Communist Party has announced that acts of sabotage against Czechoslovakia's railways are so numerous that they are a menace to the efficiency and regularity of that transportation service.—News release.

SWEDEN

Naval Increase

Sweden, which must guard 1,400 miles of coast along the North Sea and the Baltic, has brought its naval fleet up to its highest level in modern times.

At the end of the war, Sweden had 170 vessels. Since 1945, that country has been building new ships and modernizing old ones. Two 8,000-ton cruisers and two 1,900-ton destroyers have been added to the fleet. Two 2,500-ton destroyers are being built and two more are planned. Twenty craft, including motor torpedo boats, submarines, subchasers, and minesweepers, are under construction.—*The New York Times.*

AUSTRALIA

South Asian Aid

Australia has offered to supply economic aid worth $14,560,000 to India, Pakistan, and Ceylon during the present fiscal year. This aid is part of the Colombo Plan for mutual self-help among British Dominions.—News release.

Air Training

The Air Minister has announced that 25 Royal Australian Air Force pilots, navigators, signallers, and technicians are being sent to the United States to fly and study the *P2V5 Neptune*. The Australian Government has purchased *P2V5s* for the RAAF as long-range reconnaissance and antisubmarine aircraft. — *Australian Weekly Review.*

EGYPT

Military Mission

An Egyptian military mission will go to Czechoslovakia to buy arms and ammunition in return for Egyptian cotton.—News release.

FOREIGN MILITARY BRIEFS

Britain's War Secretary has announced that that country will send at least 4½ divisions to Western Germany before the end of the year.

Iraq has authorized the export of 20,000 tons of wheat to India.

In the first 10 months of the Korean conflict, the Communists lost 147 *MiG 15s* and 167 other aircraft, including *Yak 9s Il 10s, La 5s, and La 7s.*

The French Air Force recently received 17 *F-84* jet fighters from the United States.

The Admiralty has announced that Admiral Sir Rhoderich R. McGrigor will take over as head of Britain's Royal Navy in December. He will succeed Admiral of the Fleet Lord Fraser as First Sea Lord and Chief of the Naval Staff.

AFRICA

Financial Assistance

Algeria, Morocco, French West and Equatorial Africa, and the Cameroon—France's African territories—will receive a strong financial boost in the form of credits from the Marshall Plan Counterpart Fund.

A total of about 28 million dollars will be allocated from the fund, for use in irrigation, electrification, coal mining, the soundings of oil wells and building of refineries, highway and railroad construction, and harbor modernization projects.—*The New York Times.*

SOUTH AFRICA

Diplomatic Representatives

The South African and Spanish Governments have agreed to exchange direct diplomatic representatives for the first time. The appointments will carry the rank of minister.—*The New York Times.*

Defense Act Amended

South Africa has amended her defense act to allow the "active citizen force"—the equivalent of a national guard—to serve abroad as volunteers.

Before its amendment, the defense act forbade members of the citizen force to serve outside South Africa.—News release.

Synthetic Fuel Plant

The first modern commercial gasoline-from-coal distillation plant is to be erected in South Africa.

Construction of this plant will be the initial step in a program designed to make the Union independent of outside sources of gasoline. Petroleum production in South Africa is insignificant, but there are large coal reserves.

The initial annual output is expected to be 60 million gallons of gasoline and Diesel fuel, with alcohol and chemicals as by-products.—*The New York Times.*

DENMARK

Defense Plan Completed

Denmark has completed the draft of her Atlantic Pact master defense plan, which calls for the mobilization of 120,000 men and 200 jet fighter planes in case of war. The plan is expected to cost an estimated 80 million dollars a year.—News release.

WESTERN GERMANY

Wehrmacht Pensions

Former professional members of the disbanded German Army will draw monthly pensions ranging from 24 dollars for sergeants to 230 dollars for generals. The West German *Bundestag* (Lower House) approved the law regulating financial support of *Wehrmacht* soldiers in recognition of their services to the state.—News release.

Displaced Persons Aid Fund

Creation of a special fund to promote the integration of displaced persons remaining in Germany has been announced by the International Refugee Organization (IRO) and the Expellee Bank Corporation of Bonn, an agency of the German Federal Government.

The agreement will enable a limited number of refugees under IRO protection to borrow up to $1,190 from a fund established in the Expellee Bank.—*Information Bulletin:* (Office of the US High Commissioner for Germany).

BRAZIL

Trade Increase

The value of trade between the United States and Brazil during the first quarter of this year was more than twice the amount during the corresponding period last year. Commerce between the two countries was valued at 401 million dollars during the first quarter of this year, as compared with 196 million dollars a year ago.—*The New York Times.*

BELGIUM

Mapping Project

Belgium will spend 14 million dollars mapping its vast colony in Africa—the Congo—during the next 10 years. This will be done principally by aerial photography. Unless new methods are discovered, authorities do not expect the task to be completed before the year 2011.—News release.

JAPAN

Ship Purchase

The Japanese Government has received approval from Headquarters, Supreme Commander Allied Powers (SCAP), for the purchase of four British ships totaling 38,641 tons and costing 3 million dollars.—News release.

Economic Assistance Program

United States occupation authorities have announced a program for future United States-Japanese economic co-operation to stimulate Japanese industry and assist that country in building democratic might against communistic aggression.

The program offers Japan full assistance, including United States Government and private credits. It offers Japan a chance to re-enter the world market fully, but it warns that Japan must seek new sources for raw materials, must put her prices on a competitive basis, and must not undercut prices in the international market as she did before World War II.—News release.

NORWAY

Draft Extension

The Norwegian Parliament has approved a Government proposal to extend compulsory military service to 12 months for all branches of the armed services. In addition, all men will be called up for a yearly repetition course, lasting 60 to 90 days. Most military service previously lasted 9 months.—News release.

THE NETHERLANDS

Defense Bill

The lower house of the Dutch Parliament has passed a "national defense obstruction bill" giving the Government wide powers to commandeer sites for urgent military projects under the Atlantic Treaty. The bill would enable the military authorities to bypass lengthy litigation by local authorities in building defense works, garrisons, and new airfields.—News release.

USSR

Satellite Forces

The Soviet Union's European satellites now have armies totaling between 1,500,000 and 2,000,000 men, equipped with at least 2,000 tanks, according to estimates of an authoritative British review.

The Chatham House Review of the Royal Institute of International Affairs described the satellite armies as a "formidable force" with high fighting qualities.

The air forces of the satellites were said to be negligible thus far, and their navies "practically nonexistent."

Maximum estimates in the report contained the following details:

Armies: Poland, 450,000; Czechoslovakia, 250,000; Hungary, 180,000; Rumania, 280,000; Bulgaria, 180,000; and Albania, 60,000, for a total of 1,400,000.

Security troops (fully equipped police forces): Poland, 200,000; Czechoslovakia, 150,000; Hungary, 120,000; Rumania, 150,000; Bulgaria, 100,000; and Albania, 20,000, for a total of 740,000.—News release.

Soviet Medical Team

A North Korean radio station has announced that a Soviet medical team is operating in that area. According to the broadcast, the medical mission is carrying out a preventive campaign against smallpox and other infectious diseases.—News release.

The Last Great Attack of the German Bombers In the Eastern Theater of Operations

Translated and digested by the MILITARY REVIEW from an article by Brigadier General Hans-Detlef Herhudt von Rhoden, Retired (last Chief of the Department of Military Science of the Luftwaffe), in "Europaische Sicherheit" (Germany) Issue No. 1, 1951.

DURING the early years of its development, both the strategy and equipment of the *Luftwaffe* were shaped to conform to the general idea of independent air action against the enemy's sources of strength—his centers of production. This idea of independent air action found expression, after 1940, over the British Isles, over the Atlantic and the North Sea, and also in the Mediterranean. However, numerical weaknesses, technical inadequacies, and the enemy's air defenses prevented the anticipated results. The major reasons for these deficiencies can be attributed to the fact that the bomber arm was not reinforced sufficiently; its existing equipment became outmoded; and its strength was worn away in close-support missions for the Army in critical ground operations. In addition, the defense of Germany and the air supply of the "strongholds" also absorbed personnel and matériel.

In spite of this, the offensive idea still remained alive in the Eastern Theater of Operations, but the air forces were much too weak for the many important targets which dotted the broad Russian expanse. Operational ranges were limited, there was an inadequate supply of bombs, and operations were thinned out in time and space.

Lessons From the Past

Not until 1943 did the German *Luftwaffe* Command attempt to draw lessons from their failures.

In that year, the Chief of the *Luftwaffe* General Staff made the decision to organize strategic bomber formations for use on the Eastern front and to repulse the expected invasion in the West. Based on the concept that this employment of the *Luftwaffe*, in the long run, would give the Army greater relief than the air attacks made on the battlefields, it was decided that the Army must and could endure the resultant temporary additional load, if, at the same time, a close-support corps were organized, equipped with *Fw-190s*.

While plans were being completed for a long-range bomber force, the German offensive at Orel and Bielgord, which had started on 5 July 1943, bogged down and stopped. On 10 July, the Soviets counterattacked, and, by the end of August, had a major offensive rolling along the entire southern front.

Long-Range Combat Corps Formed

Without regard for this situation, the German Fourth Air Corps (equivalent to a numbered air force), which had been operating in the Dnieper area, was pulled

out of the front and reorganized as a long-range combat corps.

This reorganization was the result of a directive issued by the *Luftwaffe* High Command which stated that the success of the Soviets could be attributed to their growing fire power and mobility, the result of the expanding Soviet war industries. Further, this directive called for systematic and intensive operations against Soviet industrial installations, which, in the end, would provide effective relief from the Soviet pressure on the Eastern front.

Soviet Increases Estimated

The strength of the Soviet Air Force, as of 1 November 1943, was estimated at 23,000 planes, excluding training aircraft. At the same time, it was estimated that the strength of the Soviet Air Force would increase to 29,000 planes by 1 April 1944. This increase was expected even though the Soviets were losing an estimated 1,900 planes each month in combat operations.

In addition to the gains expected for the air force, the Germans also estimated that expanding production would provide the Soviets with 11,000 tanks by 1 April 1944.

In view of the weakness of the German forces, it was desired to concentrate efforts on the most vulnerable portion of the Soviet war industry—its power plants and aircraft engine industry.

German estimates predicted that a 50 percent reduction in electric power production could put the war industries in the Moscow area and on the upper Volga out of operation, and a 50 to 60 percent destruction of the aircraft engine works in Kuybishev, Kasas, and Ufa would cause a production loss of 5 to 6 months. However, these plans were never realized, because the range of action for the available aircraft would permit attacks only against the Moscow-Yaroslavl area (see Figure 1). In addition, by November 1943, the airfields in the Pleskau and Bobruisk areas were very close to the front—and in danger of falling into enemy hands.

Planning Inadequate

The planning for strategic air operations did not take into account the withdrawal requirements of the ground forces or the technical shortcomings of the outmoded *Luftwaffe* matériel. However, the decision to organize a long-range bomber corps was correct, even though it no longer was able to change anything in the German conduct of operations as a whole. We recognized the correctness of this decision in the results achieved by the Fourth Air Corps in its attacks against the Soviet rail net, and its air attack on an American bomber formation at Poltava.

In mid-March 1944, it was announced that the Fourth Air Corps was ready for action against Soviet industrial targets. Training had been perfected to the point where night attacks, similar to the British bomber attacks, could be carried out, even against small targets. With the help of the pathfinder groups and their markings, good results were expected, even in the great expanses of the East.

At this time, the Fourth Air Corps consisted of the following units, with a total strength of 350 bombers:

1. The 4th Bomber Regiment (equivalent to a wing) consisting of two groups (equivalent to a squadron) and a headquarters echelon, equipped with *He-111s*. (This regiment provided the pathfinders for the Fourth Air Corps.)
2. The 27th Bomber Regiment, consisting of two groups equipped with *He-111s*.
3. The 53d Bomber Regiment, consisting of three groups, equipped with *He-111s*.
4. The 54th Bomber Regiment, consisting of three groups, equipped with *He-111s*.
5. The 1st Group of the 3d Bomber Regiment, equipped with *Ju-88s*.

Attacks Against the Rail Net

While the planning for operations

against the Soviet war industries was in progress, it was suggested that the Fourth Air Corps should make a few attacks against Soviet rail installations to determine what results could be expected in future operations.

In the meantime, the situation became worse because of an offensive being prepared by the Soviets west of Kiev. However, the Supreme Command hoped that massed air attacks against the enemy's rail net would be able to sap the strength from the expected break-through attempt. Therefore, the planning for operations against the Soviet war industries was discontinued and plans started for launching an attack against the Soviet rail net.

Night after night, the Fourth Air Corps made concentrated attacks against key points of the Soviet rail net (see Figure 2). In addition, small groups attacked the minor rail centers, although these were extremely difficult to locate. The minor rail centers could not be disregarded, because the Soviets would move their rolling stock to these points when attacks were expected on the larger rail centers.

Attempts were made at daylight attacks, but adequate fighter protection could not be provided, because most of the fighter formations were tied down in the West or in the defense of Germany. In addition, the range of the fighters that were available was limited to about 220 miles so that they were unable to accompany the bomber formations during the most hazardous parts of their flights.

Last Strategic Operation

Such was the situation when the *Luftwaffe* undertook its last strategic operation on the Eastern front—an attack on an American bomber formation at Poltava.

At 1000 on 21 June 1944, the Chief of Staff of the Fourth Air Corps was called

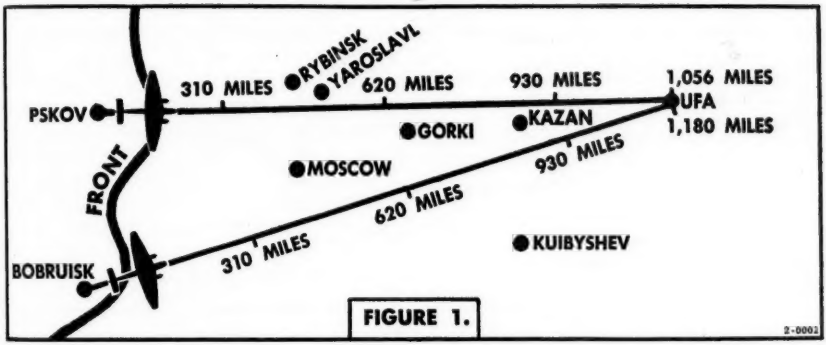


FIGURE 1.

to the teletype for an incoming report from the 6th Air Fleet (equivalent to an air command). This report stated that a strong American bomber formation with fighter protection had made an attack on Ruhland, Germany, and had continued over Posen and on to the southeast.

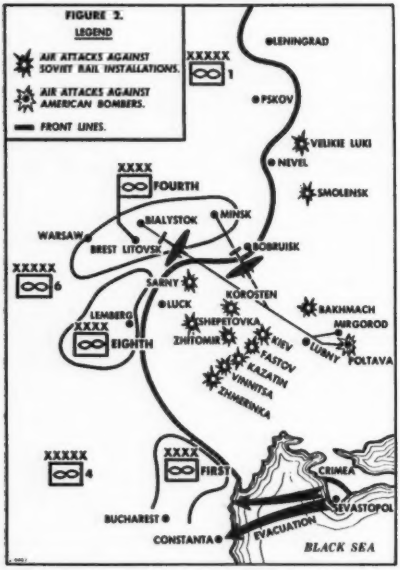
The staff was greatly excited; United States bombers were in Russia! Was this a "shuttle operation" or was this the beginning of a powerful American air force in Russia? The presence of American bombers on the Eastern front presented a serious problem, for German ground operations would be unpredictable if supply lines were broken by a systematic bombing campaign.

Air Attack Proposed

The corps immediately contacted the 6th Air Fleet, proposing the launching of an attack against the American formation.

This, in turn, was forwarded to the *Luftwaffe* High Command. In the meantime, air reconnaissance had shown that about 140 *B-17s* had landed at Poltava and about 56 *P-51s* were present at Mirgorod (see Figure 2).

Not until 1500, on 22 July, did the awaited attack order reach the corps: "The Poltava and Mirgorod airfields are to be attacked tonight. Both the American



bombers and fighters are to be destroyed at the same time."

The distance to Poltava and Mirgorod was approximately 620 miles from the Brest Litovsk area, the location of the Fourth Air Corps headquarters, which was greater than the range of the bomber formations. The target could be reached only from the Bialystok and Minsk areas. Therefore, the 27th, 53d, and 54th Bomber Regiments prepared to move to those areas.

Preliminary Orders Issued

The preliminary orders were issued quickly: "Prepare to move. Load bombs at home fields. Final fueling at jump-off base at Minsk. 110-pound bombs and 10 percent incendiary bombs. Bomber-stream attack. Time of attack 2400. 27th and 53d Bomber Regiments attack Poltava. 54th attacks Mirgorod. Distribute pathfinders accordingly. Attack commanders being determined. Further orders follow. Air photographs are being flown to you." (The air photos arrived in the late afternoon and showed an almost peacetime disposition of the American planes.)

Twenty pathfinders were assigned to each of the attack groups (the Poltava group and the Mirgorod group). They were to be over the target at 2345—15 minutes before the bomber formations.

The weather prediction forecast 80 to 100 percent cloudiness on the way to the target, with a cloudless sky and bright moonlight over the target areas.

Weather Restricts the Attack

In the meantime, a sudden rainstorm softened the ground to such an extent at the jump-off field of the 27th Bomber Regiment that it was impossible to load the bombs or get the regiment off the field in time to participate in the attack.

However, the *Luftwaffe* High Command wanted the attack carried out against both airfields, so the two remaining regiments were each assigned an airfield to attack.

Radio navigation was based on the Minsk navigation control radar station and the Warsaw long-range, rotating-beam station. Ground orientation would be difficult. However, the broad Dnieper, which flowed in a wide bend around the target area, would provide a good reference mark.

At 2100, the pathfinders of the 4th Bomber Regiment took off from Bialystok, followed by the 53d and 54th Bomber Regiments from Minsk. It was twilight when the formation took off, but soon it was

dark and ground orientation became difficult. However, the pathfinders were able to orient themselves, and agreed on the bearing to the targets.

But the attack did not go according to plan.

Error Brings Success

Because of a navigational error, the pathfinders that set out for Mirgorod arrived at Poltava, and with them the 54th Bomber Regiment which also was to bomb Mirgorod. Therefore, the attack commander of the 54th Regiment decided to bomb Poltava instead of attempting to locate Mirgorod.

This accidental navigational error and a correct decision by the attack commander brought strategic success. Some 200 planes dropped their bombs, without suffering any losses. Photographic reconnaissance the following day showed that 47 *B-17s* had been destroyed and 26 damaged.

Because of a lack of fuel, this attack was the last strategic offensive operation carried out by the *Luftwaffe* on the Eastern front. From that time on, only nighttime nuisance raids were carried out. When the Soviet attack of 21 June 1944 resulted in a break-through, the Fourth Air Corps was disbanded, because all aircraft were required for close-support missions for the ground forces.

Strategic Air Forces

Today, also, the strength of an air force lies in its long-range bomber formations. Such formations have no part in supporting ground operations. Rather, they are the combat means of the supreme command and should be used to influence the strategic development of an intercontinental war of attrition. They must be created with foresight and engaged in mass, deep within the enemy's strategic areas.

At the same time, however, an air force always will have the task of directly supporting the decisive land front during offensive or defensive operations, and of lightening the tactical operations of the naval forces. However, strategic formations are not suitable for these missions. An air force command which fails to see this will soon lose its principal combat means and its strategic freedom of operation.

A prime objective of this country must be to find a counterbalance to the potential enemy's masses of ground troops other than equal masses of American and allied ground troops. No such balancing factor exists other than strategic bombing, including the atomic bomb. Only by that method can those masses of ground troops be weakened at the source of hostile military power.

General Hoyt S. Vandenberg

An Indian Ocean Pact

Digested by the MILITARY REVIEW from an article by
Commander H. E. Fleser Paine, Royal Navy (late Captain, Royal Indian Navy),
in the "Journal of the Royal United Service Institution" (Great Britain) February 1950.

DURING recent months, both India and Pakistan have been steadily building up their navies. India now possesses a cruiser—INS *Delhi* (late HMS *Achilles*)—and is adding several destroyers to her fleet. Pakistan also is acquiring destroyers. This is an excellent sign that the two countries are alive to the necessity for naval defense, and to the fact that, throughout the ages, the sea has been, and still is, of the greatest importance to the Indian continent.

Sea Power and the Indian Continent

If we look back through history, we find plenty of evidence to show that, more than a thousand years before Vasco da Gama arrived at Calicut, a regular trade was being carried on between the Red Sea and parts of the west coast of India. Later, we have accounts of large Chinese junks trading with Malabar ports. By the time the Portuguese arrived, the visits of the junks had stopped, and practically the entire sea trade in the Indian Ocean was in the hands of Indian and Arab seamen. It did not take the latter long to realize that the new arrivals might become a dangerous threat to their trade monopoly, and they fought bravely to preserve their rights.

Control of Indian Trade

At first, the Indian fleets put up some excellent fights against the newcomers, and, on at least one occasion, inflicted a severe defeat on their Portuguese adversaries. The latter, however, chiefly owing to their superior armaments and, at times, owing to the bickering between rival eastern commanders, gradually overcame this opposition and, having established bases at such places as Socotra, Ormuz, Goa, and Malacca, were in a position to control the entire trade to and from India.

The Portuguese were followed by the British and the Dutch, and later the French. When the newcomers first arrived, the Portuguese had the great advantage of being in possession of the best bases, but they gradually lost these through failing to keep sufficient ships to maintain their sea communications. One by one, their ports were isolated and captured, and Goa, although still remaining in Portuguese hands, was blockaded and cut off from the outer world. Portuguese power in the East was lost because she failed to maintain her navy at an efficient strength.

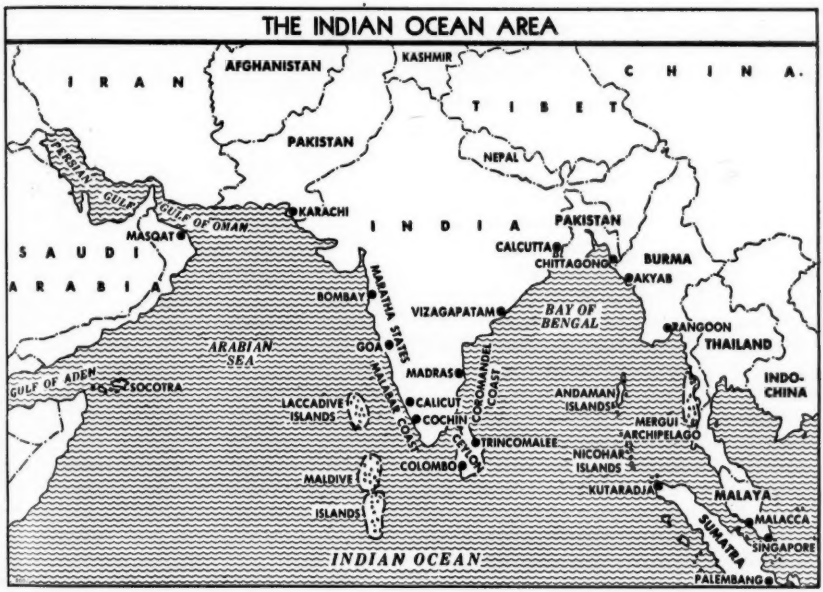
Although the seventeenth century was one of bitter struggle between the English, Portuguese, and Dutch, it must not be thought that during this time eastern ships and sailors had faded out of the picture completely. It is true that when most of the legitimate trade in the Indian Ocean had been taken over by the Europeans, the local sailors found piracy a better paying business. They took full advantage of the confused situation, and powerful Masqat, Maratha, and Kutaradja fleets were a constant menace to all ships passing their squadrons. In spite of this, a certain amount of peaceful trade still was carried out by Indian ships, and, in 1698, we find East India Company ships convoying the Mogul's pilgrim ships across the Arabian Sea.

Pirates a Threat

The pirates of those days did not limit their depredations to individual ships. In 1698, a Masqat fleet descended on the Portuguese possessions in East Africa and captured Mombasa and other ports to-

gether with several hundred miles of coast; possessions which were destined to belong to Masqat for more than 150 years. Bombay was threatened by both Mogul and Maratha fleets. European pirates also were active and among them we find such

74-gun ship on its own. Mauritius had been neglected by the French, and, after three engagements with the British fleet, the French naval forces under D'Ache were forced to return to France for repairs, leaving the English fleet again in command



names as Kidd, Avory, Chivers, Babington, and Bowen.

British Control the Indian Ocean

The eighteenth century was occupied chiefly with the struggles between the English and French. Shortly after the Peace of Utrecht, the French acquired the island of Mauritius, which, lying midway between Cape Town and Colombo, was of immense strategical value. Soon after this, the War of the Austrian Succession broke out, followed by the Seven Years' War. During the latter war, the English fleet had an efficient base at Bombay which was quite capable of building a

of the Indian Ocean. Mahan, in his remarks on this war, said:

> The one nation that gained in this was that which used the sea in peace to earn its wealth and ruled it in war by the extent of its Navy, by the number of subjects who lived on the sea or by the sea, and by its numerous bases of operations scattered over the globe. Yet it must be observed that these bases themselves would have lost their value if their communications remained obstructed. . . .

This remark applies just as well today.

Example of Service Co-operation

In 1778, war again broke out between France and England. The English ships were under the command of Sir Edward Hughes, a seaman who appears to have been possessed of more than average

ability, but who probably became fatigued toward the end of the campaign. The French squadrons were commanded by Suffren, who was a first-class tactician with an unlimited driving power and an extraordinary ability to appreciate any situation that might arise. All the fighting took place off the Coromandel Coast between Madras and Trincomalee. This campaign is interesting because it indicates the importance of the latter place as a base. At first it was held by Hughes, but later was occupied by Suffren, and, being the only sheltered harbor on this coast, played an extremely important part in this campaign. This last struggle between the French and English in these waters was an excellent example of the co-ordination between the Army and Navy. The Army was almost completely dependent upon the Navy for supplies and reinforcements, while the Navy was largely dependent upon the Army for the protection of their bases. Air power—now a necessity to both the Army and the Navy has not relieved the dependence of the two latter services on one another in a campaign of this type.

Lessons From Naval Warfare

Before moving on to modern days, it might be worth while to look back at the lessons learned from the last 2,000 years of sea warfare in these waters. These can be classified under four main headings:

1. The need for adequate bases strongly defended and supplied.

2. The necessity for the retention of sufficient sea forces to maintain communications between those bases.

3. The value of a well-equipped and well-trained striking force to take action the moment war is declared.

4. The importance of complete co-operation between the services.

During World War I, the Indian Ocean was only slightly affected. The cruises of the German raiders *Emden* and *Wolf* were merely brief episodes which, although they caused a considerable upheaval at the time, did not have any lasting results.

The Japanese Menace

The last war, however, was a much more serious affair. India was threatened from both the west and the east: from the west when Italy entered the war, and from the east when Japan attacked. The Italian fleet never became very dangerous, though its submarines might have interfered seriously with and damaged shipping in the Arabian Sea, including the important oil traffic from the Persian Gulf.

The Japanese attack, however, was a different matter. Our Indian Ocean strategy had been based on the supposition that Singapore would be held. After its surrender on 15 February 1942, events moved with almost bewildering swiftness. Palembang, in Sumatra, was occupied by Japanese troops the following day. Less than a month later, Rangoon was evacuated, and by the end of March, the Andaman and Nicobar Islands had been occupied. The Japanese now were in possession of practically the entire eastern seaboard of the Bay of Bengal; Akyab and Chittagong alone still remained in our hands.

Early in April, the Japanese fleet entered the Bay of Bengal and carrier-based aircraft attacked Colombo and Trincomalee and sank the carrier *Hermes* and the cruisers *Dorsetshire* and *Cornwall*. Our East India fleet, under the command of Admiral Somerville, was composed largely of obsolescent ships, and we were very short of aircraft. It was obvious, under these circumstances, that Trincomalee—our only remaining base in the Bay of Bengal—might well prove a death trap. As a result, the Allied fleet was forced to seek bases in the Arabian Sea. One might almost imagine Sir Edward Hughes and Suffren nodding their heads and sympathizing with Admiral Somerville's difficulties.

Failed to Exploit Advantage

As it happened, the Japanese failed to take full advantage of their earlier successes. After this one sally into the Bay of Bengal, their fleet retired to Singapore and never again ventured to enter the Indian Ocean in strength. This failure to follow up the initial success in these waters probably was due to their general strategy. Their pattern of advance had been an eccentric one which had given them the advantage of interior lines of communications. There were, however, disadvantages to this form of strategy, which had caused considerable dispersal of their fleets and had prevented them from concentrating their efforts in any one direction. As we know, while one fleet was operating in the Indian Ocean, a second was engaged in the advance toward Australia. Early in May, 2 days after we had landed a force in Madagascar, this second fleet sustained its first defeat in the battle of the Coral Sea. A month later, a third Japanese fleet was defeated at Midway Island. As a result of these events, the threat to India definitely receded.

For a moment, however, let us go back to April 1942. From the Axis point of view, the answer surely would have been for the Japanese to have concentrated their forces and made an all-out attack on India in an attempt to join up with her western partners. Had she done so, there is little doubt that the Allies would have been in a very dangerous position and the fate of India would have hung in the balance.

Later, had Japan pushed her submarine campaign with the same relentlessness that the Germans used, shipping in the Bay of Bengal and the Arabian Sea might have been brought to a standstill. All of this would have been the result of insufficient sea power on the part of the Allies.

Future Security

What is the position today? An attacking power will strike quickly, probably more quickly than Japan did in 1942. The Indian Ocean is bordered, especially on its eastern side, by small countries, many of them in a state of political uncertainty. These include Burma, Siam, Malaya, and Indonesia. To the northward, there are Iran and Iraq; farther west, the Arabian States and Egypt. Finally, there is East and South Africa. None of these countries is capable of dealing with a powerful aggressor on their own. All of them are, to a greater or lesser extent, dependent on sea communications, and the majority of them possess excellent potential bases.

A Pact for Security

It would seem that the only answer for the preservation of the security of these countries would be the formation of an "Indian Ocean Pact." India, Pakistan, and Ceylon are the countries primarily concerned—they would form the core. It is essential, therefore, that these three countries should work together in matters of external defense. The other major party in the formation of this pact would be Great Britain. What forces are available to put teeth into such a pact?

During the years preceding 1939, the Royal Indian Navy had a hard struggle, at times, even for existence. Thanks, however, to the untiring endeavor of senior officers, especially those loaned by the Royal Navy, there was, in 1939, the hard core on which a service of sufficient strength to play its proper part in the struggle for freedom could be built. Even then, the core was woefully small, and consisted of some half a dozen small ships and about 1,200 officers and men. By the end of the war, the service had expanded to a force of some 200 ships and more than 30,000 officers and men. Ships of the Royal Indian Navy had served in the Atlantic, the Mediterranean, and throughout the eastern seas. At the time of the Japanese surrender, many of the senior Indian officers were in command of ships at sea, and others were holding important staff

jobs ashore. It looked as if the Royal Indian Navy was well on the way to becoming a force able to take a major share in the defense of the Indian Ocean. Then came the granting of Dominion status and the division of the Navy between India and Pakistan. This was no easy task, and it says much for the senior officers of both navies that it was done in an atmosphere of complete cordiality and co-operation.

From this it will be seen that there is solid ground on which to build an Indian Ocean Pact. The navies of Great Britain, India, and Pakistan, together with those of the Commonwealth countries, especially Australia and New Zealand—who certainly would be indispensable partners in such a pact—have worked in the closest harmony in the past. It is essential that they should continue to do so in the future, for each has a vital contribution to make.

Bases

How do the lessons of the past point the way to the future? First, we come to the age-old problem of bases. Neither India nor Pakistan are well served for bases. India has Bombay and Cochin on the west coast and Madras, Vizagapatam, and Calcutta on the east coast. Bombay is the only really good harbor. Pakistan has only Karachi and Chittagong. Ceylon has Colombo and the all-important Trincomalee.

With the increased range of the modern bomber and the possibility of the atom bomb, or bombs of far greater destructive power than those used in the last war, no base can be considered safe from air attack. It would, therefore, appear to be suicidal to attempt to concentrate all our resources at one or two bases. We already have seen that India and Pakistan are short of good harbors, and many of the other countries bordering the Indian Ocean suffer from the same shortage. If their resources were pooled, the problem certainly would be simplified.

Importance of Island Bases

The strategical importance of the island group in the Bay of Bengal and the Arabian Sea must be kept in mind. In their advance westward, the Japanese made use of the Andaman and Nicobar Islands. There are good harbors in both of these groups, and it is believed that the Japanese established at least two forward airfields in them. In the event of a future attack from the east, these two groups might be extremely useful. In addition, there are several potential harbors in the islands of the Mergui Archipelago.

In the Arabian Sea, running in a southerly direction from off the west coast of India and Ceylon, are the Laccadive and the Maldive Islands and the Chagos Archipelago. Also, farther west, there is Madagascar, which we were forced to occupy when the Japanese threat to India was at its height.

When one remembers the vital part some of the small islands played in the Pacific war, one cannot afford to ignore the possibilities of these island groups in the Indian Ocean.

Safeguarding Sea Trade

Next, we come to the retention of sufficient sea forces to maintain communications between these bases and to safeguard the flow of vital sea trade. It only needs a brief glance at an atlas to make one realize what sea trade means to India and Pakistan. This trade still must be protected, but, we must ask ourselves, protected against what? The answer is, first and foremost, against the submarine, and, second, against long-range aircraft.

Twice during the first half of this century, total submarine warfare has nearly succeeded. Both times, as it happened, the Indian Ocean escaped lightly; but a third time may be very different. First priority must be antisubmarine craft of a type capable of dealing with the modern submarine. It is of little use to expect to

combat modern submarines and aircraft with slow antiquated ships, converted into warships by mounting a gun forward and placing a few depth charges aft. Priority also must be given to long-range fighter aircraft and advance airstrips. Here, the island groups may well prove their worth.

In an article which I wrote in 1937, it was suggested that one of the forms of attack to which India was vulnerable was the landing of arms, money, or small bodies of troops to assist rebellion. This possibility will be even greater in the future. India and Pakistan between them have some 3,000 miles of coast line to protect, and this will have to be done mainly by sea and air patrols.

Efficient Striking Force Required

A third point is the possession of a well-equipped and well-trained striking force ready to take action the moment war is declared. This is most important, especially to an alliance of countries as widespread as those belonging to an Indian Ocean Pact. Quite apart from anything else, the knowledge that such a force was available would be of tremendous moral value to those smaller countries on the fringes of the Indian Ocean. India, as a geographical center and as one of the senior members of the pact, probably would have to be the main base of such a force. The force itself would, of course, include all three services, and the naval portion should include aircraft carriers and a repair ship. Also, there should be a number of ships earmarked for transport duties at very short notice.

Finally, of all the lessons to be learned from the past, there is none more important than the need for complete co-operation between the countries joining in the pact. In other words, there must be a joint planning staff, and all three services of all the countries concerned must get accustomed to working together.

The strength of a nation does not depend alone on its armies, ships, and planes; it is also measured by its qualities for leadership, by its resources and industries, by the determination of its people, and by the strength of its friends and allies. We are now engaged in building up our military and matériel strength, and as part of that effort we are assisting other nations in preparations for their own defense, those nations whose strength will contribute to our security.

Secretary of Defense George C. Marshall

The Bastion of Freedom

Digested by the MILITARY REVIEW from an article by
Dr. J. M. Spaight in "Norsk Luftmilitaert Tidsskrift" (Norway) April 1951.

MORE than a generation ago, Sir Halford Mackinder, the British geographer, described the "Heartland" (broadly speaking the territory of the Soviet Union in Europe and Asia) as "the greatest natural fortress on earth." Its extent and resources were so great, he suggested, that if properly organized they would enable its possessor to outstrip the world. Conflict between land power and sea power was the setting in which the concept of the "Heartland" was staged; conflict between the nations that controlled the sea and those that controlled the land, and, in that trial of strength, the trumps would be in the hands of the latter. The mightiest of the lords of the land would be the nation that controlled the "Heartland." It would hold the fate of the world in its grasp.

Haushofer and Hitler

In Germany, the same idea was publicized contemporaneously by Professor Karl Haushofer, the geophysist. Haushofer was the expounder of the then novel theory that military science must take as its datum the division of the earth into land masses and sea masses. He stated that the sea had had its day; the future lay with the land. The great inner spaces were becoming independent of the coast. Germany's *lebensraum* should be sought on the European mainland and especially to the East, and not overseas.

On that fatal day, in June 1941, when the German legions marched into Russia, Hitler was throwing the dice. But the person who whispered in his ear and prompted the throw was Haushofer. He was the prime begetter in Germany of the policy that led to her ruin.

Air Power and the 'Heartland'

An American military writer suggests that Mackinder's argument needs to be reconsidered in the light of the emergence of air power. He states that "the 'Heartland' is no better equipped with an impenetrable roof than was ill-fated 'Festung Europa,'" and that the ability of the free world to resist Soviet aggression depends on air power.

When Mackinder developed his theory, it seemed that the "Heartland" would be able to pursue a course of unimpeded and independent development because it had nothing to fear from sea power. Now, however, its invulnerability is by no means assured. There has been a new deal and the trumps are no longer all in the hands of the land power.

The Two Crescents

In the map of the world, as Mackinder saw it, there were, outside the great land mass which he termed the "Heartland," stretching across eastern Europe and all Asia north of the great mountain range, two "crescents," the "inner" and the "outer." The inner crescent he conceived as partly continental and partly oceanic, the outer as entirely oceanic. Today, it is clearer than it was in his time that these crescents also are the frontiers of democracy and human freedom. The "Heartland" now is the enemy of all that they stand for, a potential menace to which none can be indifferent. How that menace can be prevented from becoming a hideous reality is a question upon which different views may be and are held in the lands of the inner and outer crescents.

The differentiation imposes itself. It reflects a fact of geography that cannot be ignored. There are, in truth, two categories of nations standing outside the Euroasiatic massif, watching, with appre-

hension, the huge and threatening power which, as Mackinder foresaw, has arisen as a result of the disappearance of the natural check which the balance of Teuton and Slav imposed upon each. There is, first, the inner ring of states which would be the first victims of an attack from the East. Second, there is the outer circle which have the sea between them and the Soviet hordes sweeping down to tidewater. They do not look out from the same watch-tower.

Global Bombing

To many Americans, in particular, it has appeared that the security of themselves and, in the long run, of their friends in Europe would best be safeguarded by the adoption of a policy of strategic bombing by long-range aircraft. That idea perhaps was a little more prevalent before it became known that the Soviet Union, too, had developed the atom bomb. It was, naturally, an idea that appealed not only to the leaders of the United States Air Force, but to those who wished American intervention in Europe to be no more than a limited commitment and not one that would involve the dispatch of an expeditionary force of all arms.

Referring to the time before September 1949, Rear Admiral E. M. Zacharias (United States Navy, Retired) has written:

> Most of our operational plans revolved around the bomb, envisaging as they did a transcontinental war in which huge planes would take off from the scattered fields of our strategic Bomber Command in the United States, carry A-bombs to carefully chosen targets in Russia, return to the United States, and report to General Le May, "Mission accomplished, sir, the war is won." It was frequently painful and distressing to listen to young Air Force generals expounding and defending their theory, apparently convinced it was a good one and that it would work.

More recently, opinion in the United States has come round to an acceptance, though not without reservations in some quarters, of the need for a force of all arms in Western Europe to stem the feared irruption from the East. The change does not signify an abandonment of the view that Allied, and especially American, air power will have to be the instrument by which the Soviet superiority in manpower can best be offset. The difference is that the long-range bomber now is not so much the centerpiece of the picture as it was before. It is still a prominent feature, but it has had to make room beside it for the presence of defensive ground forces and of the tactical aircraft that will co-operate with them. Events in Korea have underlined the necessity for the change which has begun to take shape.

The Inner Bastion

Some of the nations of the outer crescent have been drawn into an alignment which they might possibly not have chosen had the circumstances been different. They have had to pay the price for errors of statecraft and strategy which left a military vacuum in Central Europe. The policy of containment has been an inevitable one, given those mistakes of the war years. It has been the only way whereby the disappearance of that balance of power between Germany and the Soviet Union, in which Mackinder saw the sole hope of escape from the domination of the world by the one or the other, could be prevented from having results calamitous for the free peoples. The nations who want peace, but prize liberty still more dearly, have begun to man the bastion of the inner crescent.

Interdiction

Having done so, what will their strategic policy be in the air? Its purpose clearly should be that also of the defending ground forces; that is, to halt the invading enemy ground troops. However, that does not mean that it should be a policy of close support only. There will be another way to help achieve the same end. It will be the way of *interdiction*. It can make the nourishment of the battle impossible for the enemy. The Soviet oil resources also can be attacked, but it will

be by a massive assault on the lines of communications that the enemy's further advance can be checked most effectively. It was by attacking oil and transportation targets that the British and American air forces made Germany's resistance to the Allied invasion hopeless in 1945. The Royal Air Force had begun by attacking such targets in 1940-41. We switched over to town burning in 1942. We went back to our first love 2 years later. The United States gave us a useful lead here. The Anglo-American onslaught on oil and railways rocked Germany to her foundations. It did more to win the war than all the fire-bomb attacks on her cities. The invading armies gave her the *coup de grace*, but these two great campaigns made her defeat inevitable.

The Soviet Union's defeat can be made inevitable in the same way. She has two chinks in her armor. One is her virtual dependence on a single region for her oil supply—she has almost all her eggs in one basket in the Caucasus—and the other is her very vulnerable lines of communications for an attack on the West. Cut those lines and her armies of invasion will be in irons. The greatest military disaster then may await them.

It is true that in Korea the bombing of the railways and bridges did not halt the southward movement of the North Korean and, later, Chinese troops. The conditions there were unfavorable, however, to a strategy of interdiction. The Communists' communications were fluid and indeterminate, they made little use of rail conveyance, and their logistics, in general, were primitive. The American bombers were handicapped, moreover, by the limitations imposed on their scope of operation, and were never in sufficient strength to make really massive attacks.

The Soviet Union and Her Railways

The Soviet Union is an impossible country to conquer in the traditional way, the way of invasion and military occupation. She could swallow Western armies in her vast spaces. These same spaces, an advantage to her in defense, are a grave handicap when she passes to the offensive. She is terribly vulnerable in her railways, and her railways are of vital importance for the mobilization of her forces, as well as for the functioning of her economy as a whole. Nearly 89 percent of her inland freight traffic is carried by rail, 8 percent by waterways, and only 3 percent by road. Her waterways are closed by ice for a large part of the year, and her roads are likely to be blocked by snow in winter and to become waterlogged morasses in spring. A Soviet authority has said that "the importance of the railroad of the USSR can be compared with the importance of the mercantile marine for Great Britain." She would be strangled militarily and economically if her railway network were dealt with as Germany's was in 1945.

If Germany had had a strategic air force and had used it in 1941 to smash the Soviet railways, the Red armies probably would have suffered still worse disasters than they did in that year and would have been unable to mount their counteroffensive in 1942. As it was, neither the Germans nor the Soviets understood air power. Both regarded their air arms as long-range artillery, more or less tied to the battle fronts.

The Need for Defense on the Ground

It is conceivable, of course, that, as a recent report by a Study Group of the Royal Institute of International Affairs has said, the strategic use of the atom bomb in the first stages of a war against the heart of an enemy's political and industrial system might have decisive results, but, as the same report is careful to add, there is no certainty that it would; it might not, in fact, break the enemy rulers' will-to-war. The atom bomb, the Study Group pointed out, is essentially a deterrent weapon and its value lies precisely in the uncertainty in an aggressor's mind

about whether, how, and when it would be used. It is no substitute, the report concludes, for conventional weapons. "It would be a decisive weapon only if used by a power or group of powers able to hold their own offensively and defensively without it."

The Inner Crescent Line

The line of the inner crescent, the first bastion of freedom, must be held on the ground. It will be held more confidently if the nations of the outer crescent join in repelling the attack upon the inner, and the more securely if the tremendous instrument of air power is used to paralyze the attacker's nerves of motion. The Brussels Pact was not enough; the Atlantic Pact was needed to reinforce it. Now, given the requisite force on the ground and in the air, with sea power behind it to keep the ocean traffic moving, the prospect is better than in Mackinder's day that the lands of the two crescents will be able to call a halt to the rulers of the "Heartland" and to save the world of free men. He was right in what he wrote 30 or 40 years ago; the menace was great then, and it is still great. It is merely that the geophysical factors of the equation of defense have been affected by political and technical changes which he could not have foreseen.

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Arms for Warriors

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel F. E. Anderson in the "Canadian Army Journal" (Canada) March 1951.

SPECULATIONS concerning the possibility of war, and Canada's part in it, have filled the newspapers and radio news summaries for months. Our Government is devoting a major portion of its time and energy to the formulation of a defense policy.

We must, nevertheless, be mindful of the fact that the outbreak of war in 1914 and again in 1939 found the democracies largely unprepared to meet the threats of aggressor nations. Eventual victory in those wars was possible only because we were granted several years of grace in which to mobilize and equip our armed forces. Today's weapons, and the global nature of any future major war, most likely will preclude any respite in which to organize war production in relative safety following the start of hostilities.

Teamwork a Necessity

The successful waging of modern warfare is the result of teamwork; especially teamwork between the armed forces and industry. Industry, factory buildings, workers' homes, and farms have become an integral part of the war machine; the line of distinction between soldiers and civilians has become blurred, and the line between military and nonmilitary production virtually has disappeared. Weapons have become larger in size and number, more mechanical, and more complex, with the result that more man-hours, more raw materials, and more facilities are needed in their manufacture. The ratio of the men behind the guns to the men manning the guns is ever expanding.

Mr. Bernard N. Baruch has summarized the situation in these words:

> Wars are fought and won—or lost—on the land, on the water, in the air, and on those battle lines behind the front where the civilian forces stand. It is not enough to mobilize the nation's military strength. There must be a mobilization of her full economic resources—industrial, agricultural, and financial. These must be organized, co-ordinated, and directed with the same strategy that governs the operations of the purely military arms of service.

Today's soldier is effective only to the extent that the nation he fights for has

been successful in so marshalling industry that the army's operational needs are supplied promptly and adequately. Nor can factory workers provide us with our weapons unless the entire national economy is geared to meet industrial requirements while ensuring essentials of civilian life.

Let us analyze the basis of experience that leads us to accept such concepts without doubt or criticism.

The processes of industrial mobilization, or economic mobilization, have evolved as warfare itself has changed in this twentieth century.

Mobilization Plans Inadequate

During World War I, few if any nations realized the implications of total war. Inadequate plans for military and industrial mobilization resulted in the faulty apportionment of the industrial load, and in a lack of co-ordination of the national effort generally. There were delays in the procurement of supplies and equipment, disturbances of prevailing price levels, unequal distribution of the economic burdens of war, and waste of resources. It was made apparent that a peacetime economy, unsupported and uncontrolled, could not stand up under the tremendous strain imposed by modern war. With war conditions of unlimited demand and unlimited purchase funds, opposed to limited materials, limited facilities, and limited manpower, the normal relationships and functioning of the economy inevitably broke down.

The necessity for military and industrial preparedness prior to the outbreak of war was not, however, entirely accepted by the Canadian Government in the years before World War II, though our failure to prepare for that war perhaps can be excused because of Canada's subordinate position to the United Kingdom in international relations, and in mobilization planning generally. Neither Great Britain nor the United States took adequate steps to meet the mounting crisis.

Defense Expenditures Increased

Canada's expenditures for national defense totaled only 13 million dollars in 1924-25, 22 million dollars in 1929-30, 22 million dollars in 1934-35, and 126 million dollars in 1939-40. As a measure of comparison, the amount provided in the Department of National Defence estimates at the war peak, 1944-45, totaled approximately 3 billion dollars, and amounted to 567 million dollars in 1950-51, with an additional 300 million dollars made available for Canadian assistance to other North Atlantic Treaty nations.

The Canadian rearmament program prior to World War II certainly was modest in scope. However, by September 1939, Canada, although by no means adequately prepared, was at least in a better position to provide her own protection than on the eve of any previous war. Also, prior to the outbreak of hostilities, study had been made of wartime requirements for control of the national economy. The effectiveness of that planning is apparent from the speed with which the Government initiated measures for control during the early weeks of the war.

World War II Controls

The War Measures Act of 1914, which had never been repealed, was brought into operation on 2 August 1939, and authorized all measures deemed "necessary or advisable for the security, defense, peace, order, and welfare of Canada," thus making available to the Government all necessary power to meet such circumstances as the outbreak of hostilities precipitated.

Wartime Preparations

On 1 September 1939, when the German armed forces invaded Poland and a general war seemed inevitable, the Prime Minister of Canada announced that Parliament was being summoned to meet in emergency

session on 7 September, and that, if the United Kingdom became involved in war, the Government would seek authority from Parliament for effective co-operation by the side of Great Britain.

By 10 September, Parliament had assembled and acted, and a state of war between Canada and Germany was proclaimed by His Majesty the King. The "Defence of Canada Regulations" and other emergency regulations under the War Measures Act were brought into force, and provision was made for the creation, when necessary, of a Department of Munitions and Supply.

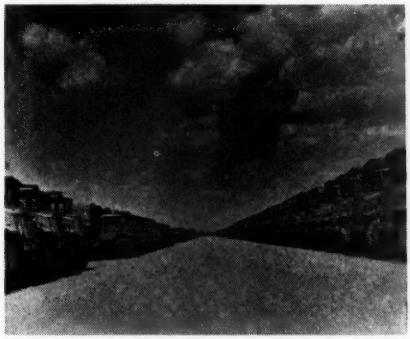
Wartime Agencies Organized

The establishment of the Wartime Prices and Trade Board, the first economic organization, was announced on 3 September, its purpose being to protect the public against increases in the costs of the necessities of life.

Previously, in July 1939, a Defence Purchasing Board was established and had begun to function before war was declared. Under wartime conditions it was realized that a board with wider powers, which would include not only purchasing, but, when necessary, the organizing and directing of supply, would be needed. As a result, the Government set up a War Supply Board with these wider powers, which took over the work of the Defence Purchasing Board on 1 November 1939. On 9 April 1940, the War Supply Board was, in turn, superseded by the Department of Munitions and Supply.

War Productivity Increased

In the early months of the war, the Government adopted an expansionist program to stimulate production; but as our productive capacity was developed and the national income rose, heavier taxes and government borrowing were used to drain away enhanced earnings. This was done to retard the mounting demand for consumer goods, so that full use would be made of Canada's increasing productivity for war purposes. As the tempo of the home front was stepped up, it became ever more necessary to divert materials, man-



A stock pile of vehicles held in readiness by the Royal Canadian Ordnance Corps.

power, and facilities from civilian to war production.

Co-ordination of Production

The need for an impartial umpire to decide upon the conflicting claims of various sectors of the war economy made it desirable that the controls affecting industry be placed in a nonmilitary agency with strong Cabinet backing. The agency primarily responsible for Canadian wartime production was the Department of Munitions and Supply, which was directed to "explore and estimate the needs, present and prospective, of the Government and the community in respect thereto, and generally to take steps to mobilize, conserve, and co-ordinate the economic and industrial facilities available in respect to munitions, supplies, and defense projects for the effective prosecution of the war."

Under this all-covering act, the Department of Munitions and Supply could tell Canadian businessmen what to make and how to make it, where to sell raw materials and where not to sell them, when to deliver

the goods it ordered, and, for failure to carry out the orders, it could commandeer factories and schedule production as it saw fit.

A Unique Organization

The Department of Munitions and Supply was unique; no similar body existed in any other of the Allied nations. Nowhere else was all purchasing for the national and Allied armed forces carried out by one central organization. Nowhere else was there an absence of competition between the army, navy, and air forces for supplies, and nowhere else did the agency which supplied the three services have the power to mobilize industry and resources to attain maximum production.

However, it should be noted that the Department of Munitions and Supply itself did not decide what goods and materials were to be purchased, but rather, it acted as purchasing agent for the armed forces. Furthermore, the Department of Munitions and Supply did not inspect nor receive the munitions of war and the supplies that it purchased, nor did it pay for them. The former was done by the Inspection Board of the United Kingdom and Canada, and by those who were to use the equipment purchased. The latter was done by the Treasury officers in the department concerned.

Price Ceiling Imposed

With effect from 1 December 1941, an over-all ceiling on retail prices was imposed by the Wartime Prices and Trade Board, and, from that date, maximum prices legally could not exceed those that had prevailed during a specified basic period.

One fundamental point that should be kept in mind about the price ceiling is that it applied to each store or retail establishment individually. It did not standardize prices for any commodity or for any community. It simply required that no retailer sell any specific item at a price greater than his highest selling price for that item during the basic period.

Thus, the Government placed almost all primary and secondary materials under a system of controls operated jointly by the Department of Munitions and Supply and the Department of Finance (Wartime Prices and Trade Board). In the process of organizing the country's productive resources, these two departments supervised virtually the entire range of our economy. However, the normal peacetime business of government hardly could be suspended nor could just two departments carry out all of the federal administrative duties; other departments and agencies obviously played their part. The unifying influence and authority of the Canadian Government had to be exerted constantly in almost every field of activity which was even remotely connected with the war.

Voluntary Co-operation Effective

An outstanding feature of the Canadian wartime control organization was the great reliance placed upon voluntary co-operation. It also should be noted that although a wide variety of measures was imposed over different sectors of the economy, no two industries were subjected to precisely the same pattern of control. The particular measures instituted in each case were dictated by the peculiar characteristics of the industry, such as production processing, pricing practices, the number of producers, marketing practices, use of strategic materials, dependence upon foreign sources for raw materials, and adequacy of manufacturing facilities.

Mobilization of Manpower

There are, of course, many features essential to an effective industrial war effort—productive equipment, natural resources, research, and managerial ability—but the limiting factor in the long run is manpower.

Following the collapse of France, in June 1940, the National Resources Mobili-

zation Act was passed, authorizing the Governor in Council to require "persons to place themselves, their services, and their property at the disposal of His Majesty in the right of Canada as may be deemed necessary or expedient for securing the public safety, the defense of Canada, the maintenance of public order or the efficient prosecution of the war, or for maintaining supplies or services essential to the life of the community," with the exception that persons could not be compelled to serve in the Army, Navy, or Air Force outside of Canada or her territorial waters.

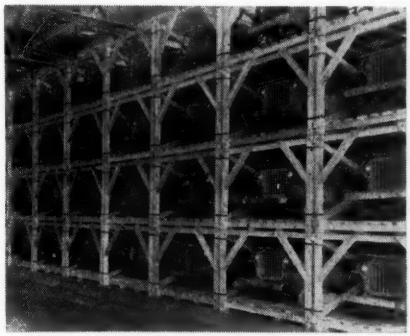
Armed Forces Expansion

When war broke out, Canada was almost completely disarmed. There were only 1,700 men in the Navy, 4,500 in the Army, and 4,000 in the Air Force; a total permanent force strength of only 10,200. On 31 December 1943, when total strength of the armed forces was greatest, there were 75,350 in the Navy, 481,500 in the Army, and 206,350 in the Air Force; a total of 763,200, of whom 33,950 were women volunteers. More than a million Canadians served in the armed forces during the war, of whom only 70,000—7 percent—failed to volunteer for service anywhere in the world.

Increasing the Labor Force

Manpower policies in Canada developed gradually. In the first year or so of war, the mere absorption of the unemployed into productive work through the normal operation of the labor market sufficed to meet most manpower requirements. Positive action by the Government, however, soon became necessary, and the program was expanded steadily until, by 1944, it applied to the entire labor force, active and potential, and was designed to secure the organization and allocation of all Canadian manpower in such a way that it would contribute most effectively toward victory. It remained the policy of the Government, however, to employ compulsion only when voluntary methods failed, and to rely on the public to do all in its power to swell the ranks of those in the three services or to do some form of war work.

The civilian side of National Selective Service dates from 23 March 1942, when the Prime Minister announced the passing of two Orders-in-Council designed "to effect the orderly and efficient employment of men and women for the varied purposes of war." This marked the beginning of a program to do under National Selective Service Civilian Regulations what the National Selective Service Mobilization Regulations were to do for the military war effort. The principal purposes of the Orders-in-Council were to estimate civilian manpower requirements, restrict the entry of men into certain specified occupations, stabilize employment in agriculture, and correlate military and civilian manpower problems.



Jeeps in storage for the Canadian Armed Forces, ready for use in an emergency.

Wage Control Policies

An important part of the Government's anti-inflationary program was the wartime policy of controlling wages. Wage rates were stabilized at the level in effect on 15 November 1941, but with cost of living bonuses added to form part of the basic

wage rates, and with Administrative Boards empowered to adjust rates so as to remove any "gross inequality or gross injustice."

Canada reached the peak of war production in the fall of 1943, when total employment also reached its peak of 1,166,000. On 1 October 1943, 13.3 percent of our total population 14 years of age and over were employed directly or indirectly on war work.

Postwar Planning

It has been demonstrated that the successful conclusion of a modern war effort entails not only the mobilization of all national resources, but the efficient co-ordination and controlled utilization of those resources as well. The task is far from simple. There are many elements essential to economic mobilization, including:

Favorable public opinion.

Price, profit, and wage controls, and rationing.

Priorities and allocations.

Military, civilian, and foreign claimant requirements.

Manufacturing facilities, public works, food, and housing.

Manpower, civilian protection, public health, and morale.

Power, fuel, transportation, and communications.

War finance.

Foreign economic relations, intelligence, and security.

Technological progress.

Over-all co-ordination.

Considerable time and effort could be spent on the detailed study and evaluation of the controls and administrative machinery involved in organizing, co-ordinating, and directing each of the elements of a war economy. However, it would seem that three of the most important basic tools or mechanisms required to convert a nation from a peacetime to a war economy during World War II were favorable public opinion, price control, and a well-defined priority and allocation system. Experience shows that it would be futile to make plans which vitally affect the lives of our Canadian people without their full support and approval. In wartime, too, there must be provision for control of prices so as to prevent or minimize the disruption of our economic structure because of the rapid increase of demand on limited facilities and resources. Also, there has to be provided some mechanism to establish and indicate the relative urgencies within or between requirement programs, whether they be for the military forces, essential civilian use, or for foreign claimants—the development and functioning of an adequate priority and allocation system.

Profitable Experience

The organization and administration of the Canadian industrial and economic effort during World War II was not without error, nor does it contain a finished blueprint for a future emergency. However, it does contain much experience that can be studied profitably, and it demonstrates the strength of a free people, able and disposed to adjust their institutions and methods quickly to meet a threat to national security.

Our war economy had this much in common with a totalitarian economy—it was a centrally planned, centrally directed, and a centrally controlled economy. The normal controls of the market place could not be relied upon safely to meet wartime requirements. Indeed, the principal mechanism of peacetime control—the price system—was, during the war, itself a major object of control. Yet, in spite of the much talked of efficiency of bureaucracy, we succeeded in organizing and running a highly complex system of war government. Administrative personnel were brought from business and industry, from the colleges and universities, and from the permanent civil service to staff Can-

ada's wartime control agencies, and proved the existence of a reservoir of organizing and supervisory talent superior to that of the dictatorships.

During the past 4 years, the control agencies have, for the most part, ceased their activities, and would have to be recreated in order to function in any future emergency.

A Five Service Team

The armed forces have become more and more dependent on the industrial and economic potential of the country they serve. No longer can we think of three defense services; we now must consider at least five—the Navy, the Army, the Air Force, scientific research, and industry. None of them can operate independently; all are interdependent and each equally essential.

It may take 6 months to train a sailor, a soldier, or an airman to fighting efficiency, but it takes much longer, perhaps 18 months, to begin production of the gun, ship, or plane he needs for combat. That much time is needed to provide the machines, the buildings, and the tools, to do the production engineering necessary, and to secure the essential materials and components before those types of equipment, not normally produced in peacetime, can start rolling off the assembly lines.

We, in Canada, have produced in the past, and can produce in the future, much more of some items—such as explosives, artillery and its ammunition, radar and signal equipment, and many other items—than the Canadian Armed Forces are likely to need. We must find external sources of supply for many requirements which it is uneconomical to manufacture in Canada. But the increased cost of relatively small peacetime orders placed in Canada should be weighed against the educational value of establishing an internal source for large volume wartime requirements.

These and other problems are being studied constantly by the Defence Committee of the Cabinet, the Principal Supply Officers' Committee, the Defence Research Board, Canadian Arsenals Limited, Canadian Commercial Corporation, the Joint United States-Canadian Industrial Mobilization Planning Committee, and the Supply Board of the North Atlantic Nations, as well as by the Industrial Defence Board and the Canadian Industrial Preparedness Association.

Planning for the Future

No plan can be hard and fast, or complete. Flexibility is a "must" in modern conflict. Changes in requirements, in designs, and in materials and methods of production must be expected. A sound knowledge of our capabilities and limitations is the essential basis of any plan.

Major General N. E. Rodger, CBE, Quartermaster General, in writing on this subject, said:

> Without attempting to forecast the future, there are certain factors and trends which are likely to apply in any future war as in the past. They are:
>
> 1. Canadian industry will be bigger and more diversified than before.
>
> 2. Because of the inevitability that the United States will participate in any future war from the beginning and because of lessons learned the last time, there probably will be a much greater integration of our industry with that of the United States.
>
> 3. Because our armed forces will likely again be elements within the larger forces of our major Allies, and will, therefore, not be supplied by a special Canadian pipe line, we can expect to see much of Canada's war production being arranged in consultation with those major Allies and not directly for our own forces.
>
> 4. Thus, we are likely to have to base our plans for industrial mobilization largely on assumed over-all requirements made up of those of our own forces, plus estimated Allied needs.
>
> 5. Similarly, efforts to develop better equipment will be hampered by the fact that, in the long run, our armed forces can hope to use only equipment of a type also used by our major Allies. This, however, should not prevent us from making a useful contribution to improvement of equipment by proving the merit of those improvements to other countries.
>
> It is important that we in Canada exert our efforts to achieve maximum preparedness in planning for the mobilization of industry as well as of the armed forces. Industrial preparedness, in peacetime, is just as important to prevent war or to win victory as is military preparedness. Furthermore, in spite of the fact that we soldiers would have a full partnership with industry in war, we should take every opportunity to improve mutual understanding and co-operation with industrialists to ensure that the over-all Canadian contribution will be given early, efficiently, and effectively.

Airborne Warfare

Translated and digested by the MILITARY REVIEW from an article by Captain E. Lorenzen in "Militaert Tidsskrift" (Denmark) November 1950.

This is the second of a series of two articles on this subject. The first article of this series appeared in the August issue.—The Editor.

IN THE first article of this series, the history and general aspects of airborne warfare were discussed. Therefore, it may be of interest to deal briefly with the various problems which are more directly connected with the planning and execution of an airborne attack.

The Airborne Attack

When contemplating an attack operation, the airborne division generally will be divided into combat teams—reinforced regiments—each of which is assigned to its own landing area. A combat team, for example, may comprise one infantry regiment, one light field artillery battalion, one antiaircraft artillery battery, and one engineer company. The formation of combat teams permits each airborne regiment to operate independently during the first phases of the attack. As soon as the situation on the ground permits, the combat team organization is discontinued, and the division commander assumes complete control of all units within his organization.

A separate airborne infantry regiment may be landed either in battalion groups, each in its own landing zone, or as a complete unit, in a regimental landing zone. A battalion group consists, as a rule, of a reinforced airborne infantry battalion.

Three Echelon Organization

Personnel, weapons, and equipment of the airborne regiment generally are divided into three echelons. The first echelon consists of parachute and glider units which have the mission of attacking and seizing possession of an airhead. The second echelon comprises the combat forces and equipment which cannot be carried in the first echelon, and is either transported by land, water, or air to join the first echelon as quickly as possible. The third echelon comprises the troops which are not regarded as decisive in the conduct of the operation, such as administrative personnel. Depending on whether the regiment is to be relieved quickly or is to remain in action for a longer period, this echelon may remain either at the base or be moved to join the regiment.

Selection of Landing Areas

Landing areas must be chosen with care, for they exercise a great influence on the maneuver plans. Therefore, the correct solution to the problem requires close cooperation between the commander of the airborne forces and the commander of the transport units. The commander of the airborne forces determines the area which, all things considered, is suitable for the accomplishment of the mission, and together with the commander of the transport units selects the various dropping and landing zones. The entire co-ordination of the plan is effected, normally, at the higher level of command.

Landing areas are determined on the basis of the following principles:

1. They must be easy to find from the air, taking into account the probable degree of visibility.

2. They must be within the range limits for the aircraft.

3. They must be close to the attack objective so that the element of surprise may be effected.

4. They must afford cover or concealment for the reorganization of the forces (if a daylight operation).

5. The terrain should offer possibilities for defensive action.

6. The terrain must permit mutual support between the various landing areas.

7. There must be, as far as possible, concealed or covered routes of approach to the attack objective.

8. The terrain must offer good conditions for suitable attack dispositions.

9. Each area must be large enough to accommodate all the troops to be dropped within it.

In regard to the principles above, it may be stated that a parachute battalion, under normal conditions, requires a landing area of about 875 by 660 yards. As a rule, small, specially equipped auxiliary groups (designated "pathfinders" in the United States Army) are dropped prior to the main landings to direct the approach of the landing forces.

The dropping of an airborne combat team (depending on the number, speed, and types of planes employed) varies from 5 to 15 minutes. A battalion should be ready for combat within 30 to 40 minutes after landing.

The normal jumping altitude is about 400 feet, with a dropping time of about 25 seconds.

Gliders are able to land at the rate of from 18 to 25 a minute.

Vulnerability of Attacking Forces

Airborne forces, at the moment of landing, are especially vulnerable to enemy ground attacks. Therefore, the hasty reorganization of the landed forces is an important factor. This reorganization takes place in accordance with a predetermined plan and with the aid of previously assigned assembly areas and recognition marks.

The first parachute units which land secure the landing areas, and the units following them regroup as quickly as possible and hasten to the assembly areas.

Troops which are landed with gliders start immediately for the assembly areas. As soon as the regiment has reorganized, it fights in exactly the same manner as the normal infantry regiment.

Tactical Considerations

Because of the particular combat conditions and the lack of certain weapons normally found in an infantry regiment, the airborne regiment must include the following tactical considerations in its plan of operations:

1. The possibility of enemy engagement immediately after the landing, and before any centralized control over the forces has been attained.

2. The lack of tanks and medium and heavy artillery (including heavy antiaircraft artillery) weapons.

3. The limited amounts of supplies and ammunition.

4. The limited means of transportation.

As is evident from the foregoing, airborne forces, during the first phase after the landing, constitute a very vulnerable target. Therefore, speed and surprise play very important roles. If airborne forces, immediately after their landing, meet a well-prepared, well-equipped, and well-grouped enemy, the advantages definitely are on the side of the defender. Therefore, it will be well to present a few ideas on the problems of conducting a defense against air-landed forces.

Defense Against Airborne Attacks

The prerequisite for an effective defense, whether it be a defense against airborne or ground forces, is a thorough knowledge of the enemy and his methods. Therefore, this principle will serve as a guide in discussing defense against airborne attacks.

As a general rule, it will be impossible to defend all areas against airborne attacks. Therefore, the first prerequisite is to determine the most likely points of attack, and employ the available defense forces at those points.

It is the mission of the defense, as promptly as possible, to learn of the en-

emy's intention to make an airborne landing by making use of all available intelligence and warning systems. After this would come the destruction of the enemy's aircraft with antiaircraft artillery fire, and the disorganizing, detaining, repelling, and annihilating of the landed forces.

If an extensive area is to be defended, forces should not be dispersed, for this will only reduce their mobility.

Organization of Defense Forces

The principal subdivisions of the defense forces include an air watch and warning system, local defense forces, and a strong, centrally located mobile attack force. Defense against vertical attacks calls for offensive action.

Because of the strategic mobility of the airborne forces, commanders, at all levels, should weigh the possibilities of defense with respect to vertical attacks, and make it as strong as possible. When the landing has taken place, the defense must be carried out in accordance with the following principles: localization, isolation, encirclement, and annihilation.

Employment of Home Guards

Units of the home guard can be used effectively in defensive action against enemy airborne forces. However, such units must be well organized and have the cooperation of the other commanders of the defense installations. The principal missions of the home guard forces are intelligence, air watch and warning services, and the construction of obstacles in the defense areas. Depending on the armament and training of the various home guard forces, additional missions in the defense can be assigned.

Assignment of Defense Areas

The size of the defense area assigned to a particular unit will depend on the number and size of the possible landing areas, the number and importance of cities in the area, the number of potential targets for enemy airborne attacks, the nature and capacity of the road net, and the mobility and fire power of the unit.

As a general rule, the size of an area that a particular unit can defend would be:

1. An infantry division: 25 to 44 miles square.
2. An infantry regiment: 7½ to 12½ miles square.
3. An infantry battalion: 3 to 5 miles square.

As regards support weapons, the size of the area assigned should take into consideration the type and range of the weapons organic to the unit. Such weapons are decentralized to provide supporting fires to cover all important objectives or possible landing sites in the area. The fire plan for each area requires careful co-ordination and direction, and should include plans for fire against low-flying aircraft, fire for landing areas, fire for supporting local defense forces, and fire support for the mobile attack forces. Smoke screens may be used to cover the movements of the attack forces.

Influencing Factors of Defense

The strength of the various defense groups (air watch and warning systems, local defense forces, and mobile attack force) will be dependent on the defense plan, on the nature of the terrain, and on the availability of forces. Normally, a division area is divided into three regimental areas, since parts of one or several regiments constitute the division's mobile attack force. A regimental area is divided into two or three battalion areas, depending on the nature of the terrain, the number of landing areas, and the number of potential attack objectives. Areas seldom will be assigned to a unit smaller than a battalion.

In order to maintain as strong an attack force as possible in a defense area, the battalion is decentralized as little as possible, except for the air watch and warn-

ing services and the local defense forces.

If the defense area is large, or the probable attack objectives and landing areas are located far apart, the boundary lines of the individual defense areas need not be adjacent to one another.

Because the strength of airborne attacks is based on surprise, it is necessary to establish warning systems in order to reduce this advantage.

Warning Systems

The near warning system consists of reporting sections from each of the defense forces. Posts generally are located on elevated terrain in order to ensure observation of all the probable landing areas within each defense area, and, in the event of an enemy landing, to be able to observe the landed forces as long as possible. These posts are located so that the fields of observation of the defense forces overlap, and their operations are co-ordinated by the various command authorities.

The distant warning system consists of all the means available for providing information of a contemplated enemy airborne attack. This includes the air arm and the intelligence organizations of the higher commands.

Local Defense Force

The local defense force consists, normally, of a number of mutually independent detachments (varying in size from squads to platoons) which are established near the probable landing areas and critical terrain features. The mission of the local defense force is to interfere with and disorganize the enemy landing, until the mobile attack force is able to execute a counterattack and annihilate the enemy.

Where two or more positions are located close to one another, the local defense commander may hold back a reserve for counterattacking or reinforcing purposes.

The total local defense force seldom exceeds one-third of an organization's strength. In the case of a battalion, a reinforced company or a force of corresponding strength generally will be employed.

The organization of the local defense position follows the same plan as the organization of any other combat position, since special weight is attached to the probable direction of attack of the mobile attack force and the ways in which this counterattack can best be supported.

Mobile Attack Force

Defense against an airborne attack requires flexibility and mobility. Therefore, in each defense area, there is a mobile attack force with the mission of counterattacking the landed forces, for a well-timed engagement of the enemy force is the decisive problem in defense against an airborne force.

The mobile attack force, generally comprising two-thirds of the organization's strength, must be motorized and have great fire power. In addition to its attack role, this force may be used to man prepared defense positions or critical terrain features.

Attack Pattern

The airborne attack normally will follow a definite pattern. First will be the air reconnaissance, then air bombings, followed by the first landing, and, finally, a reorganization and consolidation of forces. The first two phases are not definite indications of an airborne attack, but the defense force commanders must recognize the possibility for an attack, and make their plans accordingly.

From the time of the approach of the first enemy plane, the entire defense must be alert and prepared for action. All suitable weapons direct their fires against the enemy transport planes and gliders as soon as they are within range. As soon as the airborne forces begin their descent (either by parachutes or gliders) all fires are concentrated in the attack areas. In

addition, artillery and mortar fires are called for and directed by the local defense forces.

Committing the Mobile Attack

As soon as the enemy's intentions have been determined (the place of landing and the direction of attack), the mobile attack force is engaged, and support weapons outside of effective range limits are moved forward to new positions.

If the counterattack fails, the attack force consolidates its position until another counterattack can be launched. If the enemy landing is such that a counterattack has little chance for success, the mobile attack force will man positions for the defense of the enemy attack objective.

After the first landing, it may be expected that the enemy will bring in reinforcements by air. Therefore, the defense plan must be based on the idea of hindering or preventing the junction of the two forces. However, the primary aim is to destroy the first landed troops before reinforcements can arrive, or before the enemy is able to link up with other enemy forces.

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The Editor.

Some Naval Aspects of an Assault Landing

Digested by the MILITARY REVIEW from an article by Lieutenant Commander R. Stanbury in the "Journal of the Royal United Service Institution" (Great Britain) February 1951.

OF ALL the types of operations carried out by the Allies during the last war, it is probably safe to say that the assault landings must take first place because of the quantity of experience that had to be gained the hard way. In this marriage of the three services, as in all marriages, the risks and pitfalls could never be entirely foreseen and safeguarded. Thus, although planning and forethought were essential before the operation, initiative and enterprise were the prime factors at all levels once the assault itself was launched. This was all the more true when, as so often happened, the assault had to be mounted quickly.

Many Problems Involved

At first, the Navy's part in such an assault may seem comparatively simple—a matter of ferrying troops and equipment between the convoy and the beaches. Yet, even in ideal weather, and with the assault running on schedule, both the naval planning necessary to ensure the safe and timely arrival of troops and supplies on the beach, and the seamanship involved in this operation, are intricate tasks for those concerned. Many and varied problems are presented to all ranks, from the naval force commander down to the crew of the smallest landing craft. In rough weather, or when faced with an unforeseen emergency, the need for seamanship, in the widest sense of the word, is great indeed.

Composition of the Naval Force

The first problem is the composition of the naval force. This will depend largely on the length of the sea passage involved, as well as on the intelligence regarding the beaches to be used. Prevention is better than cure, and beach reconnaissance must play a considerable part, not only in the choice of landing craft or amphibious vehicles for the first waves of the assault, but also in the method and time of the initial landings.

The value of the accurate preliminary reconnaissance of the assault beaches was shown time and again during the last war. At Tarawa, where no reconnaissance of the approaches to the beach had been made, the American Marines paid heavily when their craft grounded on an uncharted coral reef a considerable distance offshore. At Salerno, on the other hand, where it was decided to use LSTs (landing ships, tank) for the long sea passage, reconnaissance confirmed that these craft could clear a sandbank some 200 yards from shore under certain conditions of draught and handling.

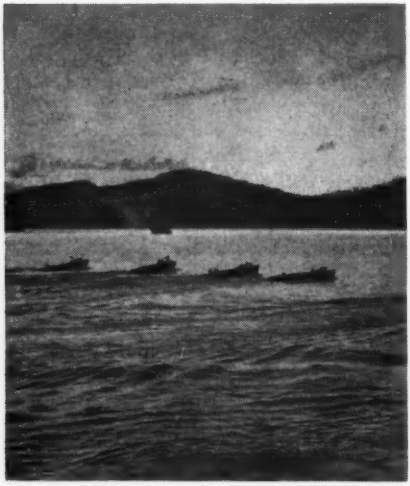
Army Requirements Control Planning

The Navy rarely can achieve more than a compromise on the craft and the methods of assault it would best like to employ. This is due to the fact that Army requirements influence and dictate the selection of the assault beaches, the number and types of troops and vehicles in the first waves of the assault, and many other factors. It can be seen, therefore, that each assault must impose a fresh set of circumstances on the Navy, and these circumstances can be met only by the crews of the landing craft through a display of seamanship.

Employment of Naval Craft

For a long sea passage, such as is common in the Pacific, the smaller landing craft normally are slung at the davits, or transported on the decks, of the larger vessels—the LSIs (landing ships, infantry) and LSTs. On the arrival of the con-

voy in the outer transport area, these smaller craft are lowered into the water alongside their parent ships, and it is here that the real need for seamanship begins. The parent ship may be rolling in a heavy swell, making the lowering and slipping of the landing craft an extremely difficult procedure. The intelligent use of steadying lines fore and aft can assist greatly; and, once the craft is in the water, the quick embarkation of the troops



Landing craft nearing the beaches during an assault landing in the South Pacific.

is facilitated immensely if all personnel have an exact knowledge of the layout of the craft and the positions they must occupy. Above all, they must in no way interfere with the work of the crew. Practice makes perfect, and this is a case where nothing short of perfection will do.

Once clear of the parent ship's side, the landing craft are collected, either by their flotilla leader or a special navigational motor launch, and the journey to the beach begins. Here again, constant practice and the training of the landing craft crews in signals and maneuvering are essential.

DUKWs Are Versatile Vehicles

The ferrying of small stores, such as ammunition and petroleum products, to the beach is best accomplished by DUKWs, though it is doubtful if these could be used early in the assault. However, they are versatile machines and have been launched successfully from LCTs (landing craft, tank) and LSTs. They have proved themselves in the past again and again, and perhaps are the best—if not the only—answer to a dry landing over mud or soft sand. Another great advantage of these amphibious vehicles is that they can drive straight to the dumps inland, thereby saving time and manpower in unloading the landing craft on the beaches and subsequently transferring the supplies to dumps by truck. In any case, a prime requisite is to keep the beaches and exits clear of congestion. Further time can be saved if small stores are lowered into the "holds" of the DUKWs in specially preloaded slings, which can be disengaged quickly *in situ*.

The loading of the larger landing craft with vehicles from the MT (mechanical transport) ships is a specialized operation, and it is not intended to discuss it here beyond mentioning the question of the "marrying-up" of the drivers with their vehicles. It is not always practicable, particularly on a long sea passage, for the two to travel together, as neither MT ships nor LSTs are fitted for carrying many passengers over long distances. This is, however, more a question of convoy and beach organization, and is mentioned only in passing as being one of the many minor problems which can have serious repercussions if not organized properly and watched. Liaison between the combined Army-Navy team ashore and the ships in the anchorage must be good. Furthermore, in designing new armored vehicles and weapons, the question of loading and unloading from LCTs and LSTs must be borne in mind.

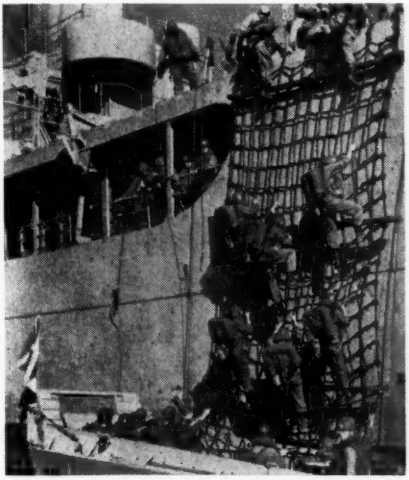
Beach Intelligence Invaluable

Volumes could be written on the different types of beaches that have been used for assault landings. Each one has called for a different technique. But the problem, from the naval point of view, resolves itself into the means for landing the troops and vehicles in the first waves without "drowning" them; for maintaining them over the beaches in all tide conditions; and for preventing the stranding of landing craft. It is here that accurate intelligence about the beaches is invaluable, and the Navy must make full use of it, as no amount of seamanship will help a landing craft to overcome an offshore bar or a flat beach. Army requirements must be balanced carefully against those of the Navy, and only a detailed reconnaissance will enable this to be done.

In 1942, I was given the task of organizing and starting the training of the Beach Pilotage School on the west coast of Scotland. The difficulties of finding a small section of a particular beach in the dark were soon brought home to me very forcibly! The smaller the type of craft, the fewer and less accurate are its aids to navigation, and there is no more helpless feeling than that of being lost on a dark night in the vicinity of rocks and reefs. In the past, landing craft have been lost or delayed because of faulty navigation, and valuable men and material have arrived too late to play their part in an operation. Confidence in the ability to navigate, coupled with an exact knowledge of the capabilities of the craft, are gained only by constant practice. They are, perhaps, the most important aspects of seamanship in an assault landing.

The method of getting a landing craft off a sandbank, or clear of an underwater obstruction, must depend very largely on circumstances—particularly the point of grounding of the craft. Altering the distribution of weight in the vessel, and hence the trim, might do the trick. Rocking the boat from side to side often can move a landing craft from a small obstruction. The use of propellers, however, should be avoided if possible, especially if the craft is grounded by the stern. Where the bottom is rocky, the blades are almost certain to get bent or broken, or else weeds will become entangled in them.

Whatever the circumstances and the nature of the obstruction, a knowledge of the tidal data for the area is essential for



Personnel going over the side during their training in assault landing techniques.

the coxswain of the craft. With a rising tide, the craft probably will clear herself without the adoption of methods which might prove injurious even if successful. Even with a falling tide, it may be more prudent to wait for the tide to turn and rise again. Only if the sea is rough, or if the weather is deteriorating, does the need for clearing the craft become imperative.

Beaching Problems

The actual beaching of the craft should present few difficulties in calm weather, as she should come clear of the beach with the lightening of her load; indeed, beach-

lines may be necessary to hold her nose into the shore, should there be a cross wind or a tide. With a heavy sea, running a stern anchor is essential, or the craft will broach-to, parallel to the beach—about the most helpless position possible. A stern anchor also should be used on a stranded craft which is waiting for a rising tide, or otherwise she merely will be pushed farther up the beach by the incoming waves.

In heavy weather, and on a coast where there is little shelter, minor landing craft are prone to drag their anchors. Rather than equip the craft with an anchor which is out of all proportion to its size, the solution would seem to be to have smaller craft secured alongside of such larger craft as are in the anchorage, or, where possible, to hoist them at the davits. The practicability of laying moorings for the minor craft also might repay investigation.

Conclusion

Events in Korea in the past few months have proved again the importance of amphibious operations in modern warfare. Moreover, there is hardly one of the danger spots of the world today where the judicious exercising of sea power, and the mounting of sea-borne assaults in the enemy's rear, would not play a vital if not decisive role in the strategy of the United Nations. It has been my aim in the foregoing remarks to bring home the essentials of the naval side of an assault landing: good intelligence, good planning, and good seamanship. If these are combined with a proper appreciation by the sister services of the particular problems besetting the Navy—particularly in the initial stages of the assault—the risks attendant on an operation of this nature can be more easily foreseen, and preventive action taken.

The Integrated Maneuver and the Artillery's Test of Efficiency

Translated and digested by the MILITARY REVIEW from an article by Major Andrea Cucino in "Rivista Militare" (Italy) March 1951.

THE concept that success in battle depends, to a great extent, on the support of massed artillery now is generally accepted. This fact, based on war experience, has been responsible for present ideas regarding the necessity for organizing large artillery units in all armies.

However, it is necessary, first, to ask the question: "Will the formation of large artillery units, in itself, achieve the desired results?" In my opinion, the answer is no!

Concentration by Maneuverability

For example, in an offensive operation, considering a normal density along the front of one piece every 4½ yards, more than 16 regiments—almost 3 divisions of artillery—would be required for each mile of front. For one thing, the span of control of each division should not exceed four to six regiments. Also, it is obvious that no army could hope to have that amount of artillery for each mile of front to achieve the desired degree of concentration. However, it is my opinion that the desired degree of concentration can be achieved through the maneuverability of large artillery units, by flexibility, and by centralized control.

No large artillery unit should be attached. All artillery units supporting a field army should be combined under one command so that the necessary control may be achieved.

For example, if an army deployed on a

front of 60 miles has to conduct a break-through in a sector 12 miles wide, it is to be expected that all the artillery within the army area will be concentrated, temporarily, on the break-through sector in order to support this operation.

The example cited is merely one of the many ways in which artillery may be massed to achieve a given mission. Similar examples could be given to illustrate operations by army corps or army groups.

Offensive and Defensive Operations

The maneuverability of artillery is not limited to offensive operations; it can be used just as effectively in defensive operations. A defensive area, no matter how strong its infantry strong points may be, is bound to be smothered by artillery and overrun by the enemy, unless the defense forces have the support of strong masses of artillery, capable of being maneuvered to achieve the desired concentrations.

At this point, it may be asked: "Is it possible to effect such a maneuver in defensive operations?" In my opinion, the answer is yes! Although it is true that the attacking force enjoys the advantage of the initiative in the offensive, it is equally true that the defending force has the advantages offered by the time element required for the attacking force to organize and launch the attack, as well as the advantage provided by the attacking force's inability to keep its preparations secret.

The necessity for the maneuverability of artillery in the defense is all the greater when one considers that, in addition to providing maneuverable fire, the artillery provides defense in depth in the area.

Artillery Strong Points

Some maintain that the stopping power of an artillery strong point is limited. There are even those who maintain that once the infantry strong points have fallen, there is nothing left but to displace the artillery to the rear, or run the risk of losing it.

As is well known, artillery employing direct fire, at short range, possesses a great material and psychological effect. These factors can be considered as the basis for such employment of artillery by the Soviets. The same method is employed by the Americans, including the use of recoilless weapons by their infantry forces.

If to the power of artillery is added the fire possibilities of the automatic weapons and bazookas, it is easy to see that an artillery strong point, adequately protected by mine fields, possesses great stopping power.

Influence of Terrain

It may be argued that although the efficiency of the means is admitted, there still remains the inherent weakness of selecting terrain for the employment of maneuvered fires. This point was important when field artillery was restricted by limited ranges. At that time, the zones of deployment were limited. However, with the fire possibilities offered by modern artillery, it is always possible to select terrain which will permit the establishment of artillery strong points and the achievement of the mission.

During World War I, with its prevailing static characteristics, the problems inherent in organizing and executing fires were, more or less, limited to delivering fire on fixed installations. Fire proficiency was the major consideration; mobility was unimportant.

Today, the employment of artillery is a problem of rapid movements, of rapid entrance into action, of efficient and effective co-operation, and, above all, of compliance with fire plans.

Training Must Change With Tactics

Tactics is an art and a science. With the evolution of tactical methods, it is necessary to adapt training methods to fit

the changes. Instead of the present exercises involving just the cadres, definite problems should be studied, such as problems involving the operations of divisions supported by numerous regiments of artillery. This type of training will ensure that all units are trained adequately and capable of exploiting the advantages of artillery.

At the present time, too much time is being expended in purely gun drill type training. This relegates to second place such problems as movement, deployment, and the rapid organization of fire. The psychological impulses behind the continuation of this type of training are well known. The problem cannot be solved by idealistic recommendations or ineffective posters. Severe measures must be taken. In my opinion, it is necessary to adopt a method of training that simulates actual combat. The method that seems to be the best adapted to the purpose is the establishing of efficiency tests for all artillery units.

Simulated Combat Conditions

After a unit has completed its preliminary training in gun drill and firing practice, all subsequent firing practice should be conducted on ranges different from those used in the previous period. Such firing practice should be organized and directed as tactical problems, under the control of the division artillery commander. Each regiment should receive its movement order the evening before the problem is to be conducted. Movement would be effected during the night, and the following morning the unit would receive its problem mission (similar to the artillery annex of an operation order in combat). Each unit then would be responsible for all subsequent actions, including deployment and conduct of fire missions. Such actions should include displacements, forward or to the rear, by each battalion in the regiment.

Integrated Maneuvers

Finally, when the necessary funds are available, a firing exercise—an integrated maneuver—should be conducted every year, in which the artillery units of several divisions would participate. This exercise should be directed by the Inspectorate of the Artillery Arm, who, in peacetime and time of war, should assume the true function of command over all the artillery.

This method of training produces the desired results. It encourages every commander to achieve a state of training necessary for combat operations.

With the mobility possessed by modern artillery, training must not be restricted to achieve only firing proficiency; it must also be geared to exploit its capabilities of mobility. Such training must not be improvised. It requires co-ordinated command and staff planning, and modern training methods.

We are bound to be on the receiving end in the early days of a possible future war. We will never initiate one ourselves, and because we cannot definitely prevent one if the other party wants to aggress we must give thought to the constant readiness of the defenses of our country.

General J. Lawton Collins

Weather and War

Digested by the MILITARY REVIEW from an article by Squadron Leader M. P. Srivastava in the "Indian Air Force Quarterly" (India) January 1951.

FROM time immemorial, man has been influenced by the weather. His mode of living, food, and dress often have been dictated by the weather surrounding his environment. However, no field of human activity has been affected by weather to such an extent as the field of aviation.

Land and sea campaigns are affected materially by weather, but not as completely as air operations. Generally, the operational area of a pilot is in the lower atmosphere (up to 50,000 feet), and this is the area where one witnesses the greatest variations in the weather.

Land Operations

No army commander would plan a military operation without taking into consideration the weather which is likely to exist at the time and place that the operation is scheduled. The movement of troops and the trafficability of roads depend on the amount of rainfall or snowfall, in addition to the terrain of the country. The clothing troops will need depends on the extremes of temperature to be encountered. The reinforcement of ground forces may be dependent on air supply, which, in turn, is dependent on the weather. All are factors which are influenced by the weather.

The Normandy invasion, in 1944, with all its intricate planning and timing, was postponed a day because of bad weather. The German Ardennes offensive, in 1944, was made possible only because Von Rundstedt was able to use the cover provided by bad weather to move and concentrate his forces for the attack. German meteorologists did a remarkable job in forecasting the bad weather, and in predicting that it would last for several weeks.

Air Operations

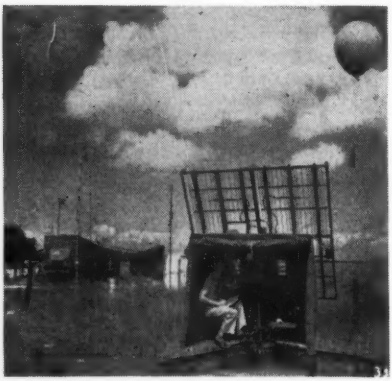
Weather plays a predominate role in air operations. Information regarding the amount and type of clouds, the visibility, and the weather conditions over the target area is vital to the success of bombing or fighter missions. In case of bad weather, it must be determined whether it is safe for the aircraft to operate and still get back to their base.

A radar antenna used to obtain data on the height and structure of thunderstorms.

The amount, height, and type of clouds have special significance in air operations. The nature of the air attack, whether high or low level, is dependent on the height and amount of clouds. The type of clouds give an indication as to the amount of cover offered during bombing or fighter missions. For example, altocumulus clouds* are useful for ambush purposes. Fighter aircraft can operate within, above, or below the cloud layer until the opposing

* Dense fleecy clouds, generally found at an altitude of 10,000 feet and above.

bombers are within striking distance. The Japanese and the Allies used clouds for this purpose. Stratocumulus clouds * are very effective for operational and tactical purposes, especially when they extend as a continuous cloud sheet. When sufficiently thick, they serve as excellent cover. However, stratocumulus clouds are not good for formation flying as the visibility in these clouds is very poor.



An operator tracking a balloon to determine the velocity and direction of the wind.

The following summarizes the operational importance of clouds:

1. When pursued by enemy aircraft, a friendly plane could enter the cloud formation, change its course or altitude, or both, and escape.

2. Friendly aircraft may approach the target area under cover of the clouds by:

a. Flying within a cloud sheet on instruments until within striking distance of the target.

b. Flying above a cloud sheet on instruments until within striking distance of the target. In case they are chased by enemy planes, refuge could be sought within the cloud sheet.

* Thin, layer-like clouds, generally found at an altitude of 1,000 to 5,000 feet.

Visibility is another important element of weather to consider in flying. Before a pilot sets out for a mission over enemy territory, he should know whether the visibility over the target is sufficient for accurate bombing or straffing, and what the visibility will be over his own base on his return.

A knowledge of the temperature at different altitudes will give good indications as to what height icing conditions can be expected.

From the foregoing, it should be clear how important the study of weather is to the successful execution of any combat operation. Some of our younger pilots are likely to laugh at the idea of the importance of weather information in the belief that they could fly in any type of weather. However, any experienced operational pilot will tell you how the weather can change completely a projected flight plan.

The success achieved by any operational pilot is due, in part, to his understanding of weather. A pilot may achieve a certain amount of success because of his navigational and piloting skill, or because of his intestinal fortitude, but his knowledge of weather will contribute materially to the success of his operation.

In modern war, it is essential to gain air superiority before land or sea operations are started. No commander would ever attempt to achieve air superiority in bad weather. The importance and usefulness of accurate weather forecasting is thus illustrated.

Weather Forecasting

The success of weather forecasting depends to a large extent on the rapidity with which observation reports reach the forecasting center. Such observations are not only required from land stations, but from sea (ship observations) as well. During wartime, such observations from

enemy territory nearly always are unobtainable and ships are restricted in transmitting weather information for fear of giving out their positions to enemy submarines and aircraft. Therefore, research is needed to solve many of these forecasting problems.

Weather forecasting has made rapid strides during the last 20 years, but the results are not yet perfect. Our forecasts are only 80 to 90 percent accurate, but before further advances can be made in the science of weather forecasting, it is essential that our communications system be improved and placed on a sound basis. We must have the means to determine atmospheric conditions up to at least 50,000 feet.

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The Effect of Air Power on Sea Communications

Digested by the MILITARY REVIEW from an article by Thomas Milne in the "Royal Air Force Quarterly" (Great Britain) April 1951.

FEW will dispute the statement that the history of the last war fulfilled General Smuts' prophecy in 1917 that "air supremacy may in the long run become as important a factor in the defense of the Empire as sea supremacy." Indeed, if the modern phrase *air superiority* is substituted for air supremacy, the statement might well form the basis for the planning for the defense of the sea communications between the various members of the Commonwealth, as it might well have done in the preparations for the last war. However, habits in defense are as difficult to change as traditions in foreign policy, and sea power, exercised as it had been for more than 150 years, remained the cardinal doctrine in our measures to safeguard our sea communications. Sea power—or the meaning that is generally given to that phrase, that is, the ability to keep open those sea routes which a country deems essential to its well-being in time of war, and to deny the use of such routes to an enemy—is still indispensable to our very existence. But the experience of the last war has made it plain that the character and type of forces necessary to exercise that command have changed.

No Rules for Air Power

Mahan made plain, for those who cared to read, the principles of sea power and the essentials of naval supremacy. No one as yet has done the same for air power, perhaps because it is still in a state of flux, and because the weapons of air power have not reached the same degree of finality as most naval weapons. Yet the fact remains that the successful exercise of air power—the winning and keeping of air superiority—is an "indispensable prerequisite of all war-winning operations." The lesson of the last war was that before success could be achieved in any sphere of major operations, a situation had to be created where the enemy air force could not interfere effectively with our operations. There is, however, no apparent formula to obtain air superiority; no set of rules, which, when applied automatically, bring about the desired result. There is nothing absolute about it, as the destruction of the enemy fleet is in the naval sense, so long as the enemy has any aircraft which he can operate effectively. A numerically larger air force does not mean eventual victory, even by a process of attrition. The winning and keeping of air

superiority is, in fact, the continuous process of air warfare in all spheres, in the air, on land, or at sea. Yet the effects of its possession, or lack of it, are easily discernible in the course of World War II.

Lessons From History Required

The old joke that the United Kingdom always prepares for the last war has a good deal of justification. The lessons of past wars always have been studied, but too often in the sense of their being the last word in the developments in warfare. If the history of warfare teaches anything, it is that the means of making war have never remained static. But any approach to the last war for its lessons must be in the spirit, not of going back to it for its lessons, but forward from them. History never repeats itself exactly; historical situations recur.

Air Power Has Changed Warfare

One of the residual theories from the days when a strong navy was all that was required for the free usage of sea communications has been that the Empire could be defended everywhere at the same time. This was no doubt true when wars were localized; but any future conflict in which the Commonwealth is engaged seems likely to be world-wide. The history of the first 3 years of the late war need not be repeated; in attempting to be strong everywhere, the forces of the Commonwealth everywhere were weak. The impact of air power is that the very ubiquity of it imposes such strain on the forces available at the outset, that to attempt to defend the Commonwealth everywhere at the same time would be disastrous. The two qualities of flexibility and concentration of air power enable an enemy to strike at several places within an exceedingly short time, and thus force the dissipation of Commonwealth forces. A decision must be made on the highest political level as to what are the essential or absolutely indispensable areas for various strategic reasons, and even those given an order of priority; instead of being forced by the march of events to make *ad hoc* decisions.

Lessons From the Mediterranean

The problem of the security of sea communications is thus resolved into safeguarding the routes between the various areas in the order of their importance. What that order should be is not within the scope of this article; its purpose is the implications of the impact of air power on the main oceanic areas. One general principle may be put forward, and that is the interaction and reaction of land, sea, and air in a closed sea such as the Mediterranean. The campaign in that sphere from June 1940 to May 1943 is the clearest example of the interplay of land, sea, and air. Excepting *V* and atomic weapons, every aspect and form of modern war was exemplified.

The war at sea in the Mediterranean in the first 6 months was dominated by the theory of the *fleet-in-being*. The "melancholy action" at Mers-el-Kebir was fought to destroy one fleet-in-being. The fleet at the eastern end of the Mediterranean was trailing its coat in a vain attempt to bring the Italian fleet to action. Its carrier aircraft in their night attack on Taranto showed what air power might do to a battle fleet in harbor. The passage of British naval forces from Gibraltar and Alexandria up and down the Mediterranean did not go unchallenged by the Italian Air Force, but its main force was engaged heavily in the land battle in Cyrenaica and was being forced out of the skies.

A Challenge to Sea Power

With the advent of the *Luftwaffe* into the Mediterranean, circumstances changed. Two months after the battle of Matapan, when by previous experience British naval supremacy was assumed in the area, naval

forces suffered considerable losses off Crete. The capture of Crete by German airborne forces demonstrated unmistakably that sea forces could not operate with any degree of safety in an area where the enemy enjoyed air superiority. Nor were the Germans slow to follow up their advantage. Their development of air bases, and their deployment of air strength in Crete, Greece, Sicily, and Cyrenaica, gradually restricted the passage of Allied shipping until it ceased altogether. Malta could be supplied only at almost prohibitive loss.

The problem facing the British and Axis alike was one of the free use of sea communications. The Axis had to be able to use their short sea routes across the Mediterranean, from the mainland of Italy to Cyrenaica, so as to be able to keep their forces supplied in the Western Desert. The British problem was, first, to cut this route and prevent reinforcements reaching the Axis, and, second, to try to reopen the route through the Mediterranean from Gibraltar via Malta to the Suez Canal and the Red Sea route to the Far East and Australasia.

Malta: a Key to Success

Malta was the key to the solution. So long as aircraft and submarine forces could operate effectively against the Axis supply lines, there could be no hope of them ever building up an overwhelming strength in Cyrenaica or in Egypt. When the operations from Malta rose to such an extent, the Axis, on three separate occasions, attempted to bomb it into submission. Malta held out and was able to continue its offensive and to deal a crushing blow to Rommel just before Alamein.

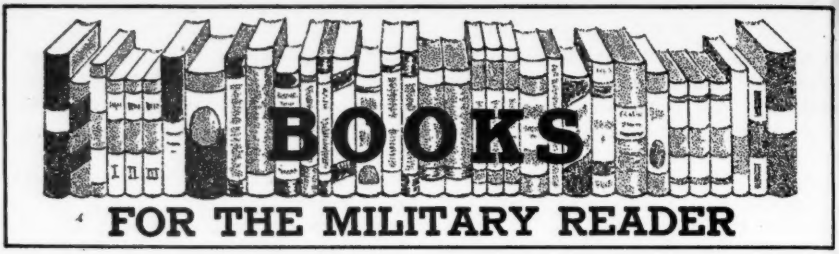
A Fight for Air Bases

From the point of view of the effect of air power on the sea routes in the Mediterranean, the land campaign was a fight for air bases, from where the air superiority exercised over the battle area could be extended to enemy air bases, ports, and supply lines. As the land battle receded farther from the Egyptian border, so air power was able to make itself felt not only on the enemy unloading ports, but on harbors and railways in Sicily and Italy. With the successful landings in French North Africa, the Allies now had most of the south littoral of the Mediterranean. But as in the east, so in the west, the necessity existed for air bases.

Air Power Comes of Age

With the merger of the eastern forces and western forces just before the final assault in Tunisia, air power came of age. There the operational formations were divided on functional lines of air power—tactical, strategic, and coastal. Each of these three groups was able to assist one another as the need arose. The greatest achievement was the realization that air power could be more efficiently and more effectively exercised, and with an economy of force not otherwise possible, by a centralized air command.

The success of air power exercised in Tunisia was demonstrated clearly in the last 2 months of the campaign. The undoubted air superiority which the Allied air forces wielded over the battlefield allowed the movements of large bodies of troops from one front to another with complete impunity. But the air superiority ranged far beyond the battle area; when the Axis attempted an evacuation, he was shown that the air completely dominated the situation, and, in co-operation with naval forces, prevented more than a handful reaching Sicily. The lesson from this campaign is very plain. Air forces are essential for the security of our communications through the Mediterranean. The former naval basis of our strategy in this area is no longer applicable.



FOR THE MILITARY READER

THE HELL BOMB. By William L. Laurence. 198 Pages. Alfred A. Knopf, New York. $2.75.

By Col Melvin F. Eyerman, *MC*

It is difficult to explain a nuclear reaction without losing oneself among the intricate designs of nuclear physics. However, Mr. Laurence has presented the facts of cost, possible materials, and the feasibility of producing a hydrogen bomb in a nontechnical manner.

Beginning with a brief historical resume' of the development of the atom bomb, the author links the new superbomb to our present program of progress in science, and explains the results of the incorporation of a proper form of hydrogen into an ordinary A-bomb so that the hydrogen could be fused into helium producing the new power. To explain this modification, the effects of the various combinations of heavy hydrogen are indicated. This explanation is somewhat complicated by weaving the cost and amounts of material required into the discussion.

The conclusions, drawn by Mr. Laurence, relative to the effective range of residual radioactivity following the use of a fusion bomb, do not agree with those of many other scientists. One is led to wonder how the concentrations required for the effects described will be achieved under normal conditions of weather and terrain. Further, the ordinary concept of the use of any bomb has been for military purposes. This concept indicates that the user desires the maximum effect of blast and fire with little regard to ionizing radiation effects. (In fact, the height of detonation of the A-bomb over Japan was set to ensure these conditions.) With this in mind, one cannot feel the author is justified in his detailed account of a fusion bomb "rigged" with cobalt.

In the second section of this book, Mr. Laurence does a creditable job of unraveling the confusing theory behind the hydrogen bomb. It is a most unfortunate circumstance that the ordinary reader will be unable to comprehend the values of heat and time which are necessary to produce a fusion of elements. More important is his final conclusion that a fusion bomb can be fabricated, and that the United States is in a very sound position to divert some of its research and production from the A-bomb to the new bomb. We certainly can maintain a position of greater security by following this pattern while the Soviet Union is in her present insecure state of advancement.

Our position and world opinion on the use of these types of weapons are explained adequately. We cannot afford to rely on "paper promises" when a weapon of this magnitude is involved. We must recognize that few ruling groups hold the fate of humanity as high as does our democracy. The Korean conflict certainly has assisted us in justifying our stock-piling A-weapons. There is no greater influence holding World War III in abeyance than our advantage in the field of nuclear research and production.

UNITE OR PERISH. By Paul Reynaud. 214 Pages. Simon & Schuster, New York. $3.00.

By COL GEOFFREY G. ELLIOTT, *Chief, British Section, CGSC*

There are few who will disagree with the author's theme, but of those who read his book there will be many who will remain unconvinced by his arguments.

The fact that Paul Reynaud is probably more qualified to discuss this problem than any other European, only emphasizes the magnitude of the problem. It is difficult for a non-European to appreciate the differences in outlook and culture between adjacent European states: for example, France and Holland, although geographically closer, are farther removed spiritually than Texas and Maine.

The author describes the dangers clearly, and outlines some of the steps which already have been taken (with a fair measure of success) to combat these dangers. He points out that European "neutralism" is just as potent an ally of the Kremlin as American "isolationism." He says that Britain is obstructionist to his idealistic Pan-European system, but without analyzing the reasons carefully. He forgets that Britain has, until very recent times, been adjacent to Europe, but not *in* Europe: that despite the political independence of the main elements of the Commonwealth, Britain still co-ordinates their economic and other mutual problems, and cannot surrender her attention completely to the European scene.

To the genuine and experienced student of European affairs, the book is interesting. It is not recommended as a comprehensive guide for the general reader: it leaves too many questions unanswered.

WEST POINT: A History of the United States Military Academy. By Sidney Forman. 255 Pages. Columbia University Press, New York. $3.75.

THE COMMUNIST TRAIL IN AMERICA. By Jacob Spolansky. 227 Pages. The Macmillan Company, New York. $3.50.

By IVAN J. BIRRER, *Ph.D.*

The author reports his 30 years' police experience spent ferreting out the Communists in the United States. Sprinkled throughout the book are some interesting revelations—the mass is old material familiar to newspaper readers.

I'M SURE WE'VE MET BEFORE. The Navy in Korea. By Lieutenant Commander Max Miller, USN. 191 Pages. E. P. Dutton and Company, New York. $3.00.

By COMMANDER RICHARD M. HAYES, *USN*

Undoubtedly scores of reserve personnel who served in World War II are plagued with the questions: "What's it going to be like if I'm called back again?" "Will I find everything new and different?"

Max Miller, in his delightful little story *I'm Sure We've Met Before*, assures his readers that the passage of time has not rendered the "reserve" useless. The niche so creditably filled by reserve personnel during World War II is again in existence. Once again the challenge is being ably met by our reserve component. True, some of the faces have changed, some of the ships are new, but the over-all picture has not been altered.

I'm Sure We've Met Before is an interesting collection of random antecdotes about the Korean War. They are recanted by an "old salt" whose greying hair belies his youthful interest in "what's going on." Max Miller has the precious gift of being able to capture the seemingly insignificant and of reporting it in a manner which breathes realism. His tales have the freshness and the depth which made Thomas Heggens' *Mr. Roberts* such an outstanding success. I recommend *I'm Sure We've Met Before* to all who enjoy a fresh yarn with a tinge of salt air.

SEVEN DECISIONS THAT SHAPED HISTORY. By Sumner Welles. 236 Pages. Harper and Brothers, New York. $3.00.

By COL GEORGE C. REINHARDT, *CE*

A diplomat's review of diplomatic history, Mr. Welles' latest book might appear to readers, who do not possess a diplomatic background, a defense of Mr. Roosevelt and Mr. Welles, with attacks upon Cordell Hull, James Byrnes, and sundry others, including the American people's frequent failure to support their President's choice of policy. The "decisions" are difficult for military men to recognize as such, since they are not succinctly stated as found in paragraph 5 of the "estimate." They are, rather, phases in the foreign policy of this Nation, from 1937 to the present.

The volume has the added interest of choice quotes, but loses in its inability to present new data. However, several novel interpretations of familiar problems are offered. Perhaps the most striking is the contention that all the evils attributed to Mr. Roosevelt's Yalta policy have resulted not from that policy itself, but from the failure of the United States to continue it effectively.

Another contention pictures Stalin as an anti-imperialist until the growing power of the Red Army at home forced him, "like Alexander I at the Congress of Vienna," to yield to the pressure of "his marshals and generals." If one rebuts with Stalin's demand for India and the Middle East, in August 1939, when "sharing the swag" with Hitler, as is accurately noted on page 79 by Mr. Welles, there is always page 200 recounting Stalin's December 1941 conversation with Anthony Eden. Noting that Eden "smiled" when Stalin forecast Hitler's doom because "he doesn't know where to stop," the Red leader continued: "You wonder if I myself will know where to stop? I assure you I will always know where to stop."

SAN MARTÍN THE LIBERATOR. By J. C. J. Metford. 154 Pages. Philosophical Library Inc., New York. $3.75.

By LT GEORGE ENJUTO, *Inf*

This is neither a book of military science nor of military history. It is a history, and a very good one.

This statement should not discourage the military reader as every historical work has some definite value. As wars are merely the effects of historical circumstances and are problems for the soldier to solve, it is the understanding of causes behind such circumstances that is essential to the solution of any given effect. History, if well written, places those causes at our disposal.

San Martín The Liberator is the biography of a great man, one who played a fundamental role in the liberation of Spanish-ruled America. His greatness is best evidenced by his having resigned his glory in behalf of the cause for which he was fighting—Liberty. Few men, however great, are willing to make such a tremendous personal sacrifice.

José de San Martín, the brilliant general from Argentina, is well known to those who speak the language of Cervantes. Unfortunately, few people in the United States know much about him for very little has been written in this country about this extraordinary man.

The book is objective: the economical, political, and social factors behind the Latin-American War of Independence are clearly exposed. The description of battles will add little technical knowledge to the soldier of today, faced with a type of warfare as complex as the problems that made them possible. The real importance of this book lies in the fact that it contributes to a better understanding of our neighbors south of the Rio Grande, which serves as a basis for mutual trust, a recognized factor in our effort toward survival.